Maintenance Guide

HP bh5700 ATCA 14-Slot Blade Server

First Edition

Manufacturing Part Number : AD171-9605A
June 2006

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1 Field Replaceable Unit Removal and Replacement

Introduction

This section provides detailed procedures for removing and replacing all HP bh5700 ATCA 14-Slot Blade Shelf Field Replaceable Units (FRUs), including important safety information.

Field Replaceable Units (FRUs) for the HP bh5700 Telco Blade 14-Slot Shelf include those shown in Table 1-1. Some 14-Slot Shelf FRUs can be “hot-swapped” (removed and replaced during normal shelf operation), while others require that all system power be disconnected before they can be removed and replaced.

Table 1-1 HP bh5700 ATCA 14-Slot Blade Server Field Replaceable Units

FRU Description	Manufacturing P/N	Replacement P/N	Exchange P/N (if repairable)
14-Slot Shelf with Backplane	AD171-2000A	AD171-67001	AD171-69001
Fan Tray		AD 171-67002	
Air Filter Carrier, 14-slot		AD 171-67003	
Air Filter Element, Qty 10		AD171-67006	
Alarm Connector Panel		AD172-67006	
Cable Tray Kit		AD171-2100A	
Front Filler Panel	AD171-0001A		
Rear Filler Panel	AD171-0002A		
Power Entry Module (PEM)		AD172-67003	
SEEPROM Assembly, Backplane		AD172-67004	
Alarm Display Panel		AD172-67005	
Flange Kit		AD171-67005	
PEM Fuse Kit, Quantity 5		AD171-67004	
Shelf Manager (ShMM)	AD190-6001	AD190-67001	AD190-69001
HP bc2100 ATCA Server Blade	AD239-60001	AD239-67001	AD239-69001
Ethernet Switch Blade	AD173-60001	AD173-67001	AD173-69001
Hard Disk Drive (HDD) HP 72 GB SAS	AD241-2000A		
1 GB DIMMs (Pair)	AD191-60001		AD191-69001
2 GB DIMMs (Pair)	AD192-60001		AD192-69001

Table 1-1 HP bh5700 ATCA 14-Slot Blade Server Field Replaceable Units (Continued)

FRU Description	Manufacturing P/N	Replacement P/N	Exchange P/N (if repairable)
Adapter Cable, RS-232 Serial Connection, RJ-45 to DB-9	A6900-63006		

The above part numbers are current as of the publication date of this manual. Check http://partsurfer.hp.com/cgi-bin/spi/main for the most current part numbers.

Required Tools

The following tools are required to safely remove and replace components within the chassis

- ESD safe mat
- Torx T-20 driver
- Torx T-15 driver
- #1 Phillips screwdriver
- #2 Phillips screwdriver
- 10-mm nut driver

Power-Off Field Replaceable Units

Field Replaceable Units are considered to be power-off FRUs if electrical power must first be removed from the 14-Slot Shelf before the FRU can be removed and replaced. Power-off FRUs in the 14-Slot Shelf include the following:

- HP 14-slot 14-Slot Shelf Chassis with Backplane
- Backplane SEEPROM Assembly (Chassis Data Module)

The following FRUs are power-off FRUs, but are removed and replaced after the HP bc2100 ATCA Server Blade has been removed from the 14-Slot Shelf by following hot-swap procedures:

- HP 72 GB SAS Hard Disk Drive (HDD) – HP bc2100 ATCA Server Blade
- HP 72 GB SAS HDD Mounting Kit – HP bc2100 ATCA Server Blade
- 1 GB Memory DIMMs (replaced in pairs) – HP bc2100 ATCA Server Blade
- 2 GB Memory DIMMs (replaced in pairs) – HP bc2100 ATCA Server Blade

Hot-Swap Field Replaceable Units

Hot-swap FRUs are considered such if they can be removed from the 14-Slot Shelf and be replaced while the Shelf remains fully operational, and if they require no software intervention before being removed. Hot-swap FRUs in the 14-Slot Shelf include the following:

- Power Entry Modules (PEMs)
- Power Entry Module (PEM) Fuse Kit
- Shelf Manager
- Alarm Display Panel
- Alarm Connector Panel
- Ethernet Switch Blades
- HP bc2100 ATCA Server Blades
- Fan Trays
- Air Filter

Safety and Environmental Considerations

Safety and environmental considerations include electrical safety, communications interference, and electrostatic discharge hazards to equipment.

Electrical Safety

Electrical safety precautions must be followed at all times when working on the 14-Slot Shelf.

WARNING High Voltage. There are no system power controls on the 14-Slot Shelf. System power (-48 VDC from multiple power domains) is applied by an external power source at all times unless disabled/disconnected at the source.

Communications Interference

Hewlett-Packard system compliance tests are conducted with Hewlett-Packard supported peripheral devices and shielded cables, such as those received with the system. The system meets interference requirements of all the countries in which it is sold. These requirements provide reasonable protection against interference with radio and television communications.

Installing and using the system in strict accordance with Hewlett-Packard instructions minimizes the chances that the system will cause radio or television interference. However, Hewlett-Packard does not guarantee that the system will not interfere with radio and television reception.

Take these precautions:

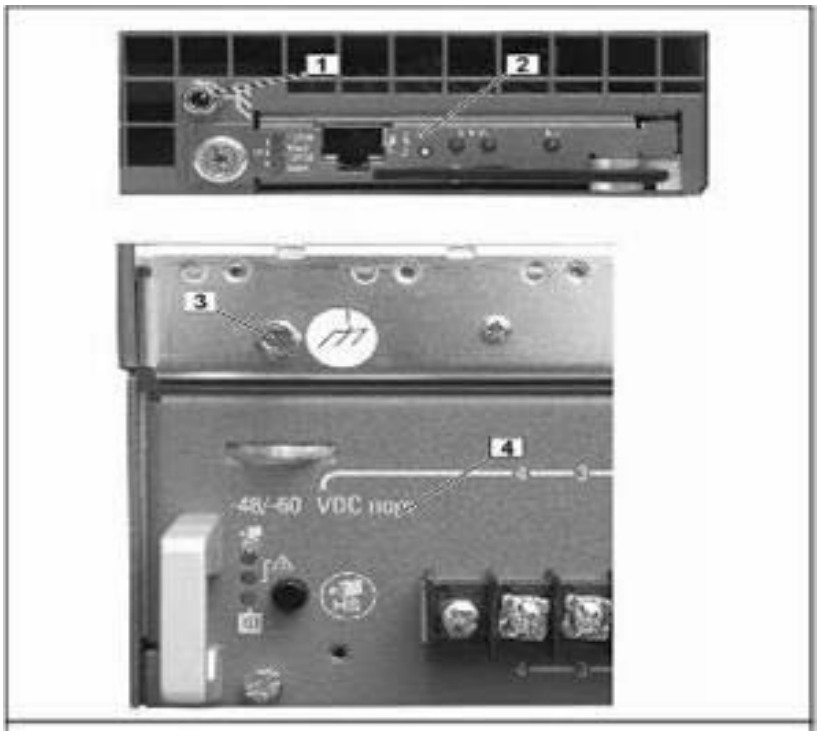
- Use only shielded cables.
- Ensure that all cable connector screws are firmly tightened.
- Use only Hewlett-Packard supported peripheral devices.
- Ensure that all panels and cover plates are in place and secure before system operation.

Electrostatic Discharge Hazard to Equipment

Hewlett-Packard systems and peripherals contain assemblies and components that are sensitive to electrostatic discharge (ESD). Carefully observe the precautions and recommended procedures in this manual to prevent component damage from static electricity.

CAUTION Wear an ESD wrist strap that is connected to the same ground potential as the unit you are working on. Connect the wrist strap to any grounded metal assembly in the 14-Slot Shelf or to one of the ESD grounding sockets (see Figure 1-1). Both you and the electronic devices must be grounded to avoid static discharges that can cause damage. If the 14-Slot Shelf is not connected to earth ground, place the Shelf in an ESD-safe working environment before removing or replacing any FRU.

Figure 1-1 Electrostatic Discharge Wrist Strap Connection Sockets



1. ESD Socket, Lower Left Front
2. Shelf Manager (ShMM)
3. ESD Socket, Lower Left Rear
4. Power Entry Module, (PEM) B

Take these ESD precautions:

- Prepare an ESD-safe work surface large enough to accommodate the various assemblies to be handled during servicing. Use a grounding mat and an anti-static wrist strap, such as those included in the ESD Field Service Kit (A3024-80004).
- Do not use the anti-static bag for any purpose other than to enclose a product. The anti-static bag that encloses new or repaired FRUs cannot function as a static dissipating mat.
- Treat all assemblies, components, and interface connections as static-sensitive.
- Keep replacement and removed FRUs in a conductive plastic bag until they are ready to be installed or shipped for repair.
- Avoid working in carpeted areas, and keep body movement to a minimum while removing and installing FRUs.

Removing Power from the Shelf

In a telecommunications environment, the 14-Slot Shelf is typically installed with a separate High Availability (HA) four-domain input power supply configuration to each of the 14-Slot Shelf Power Entry Modules (PEMs). In this configuration input power can be removed from either or both PEMs on the Shelf, as required.

WARNING WARNING: High Voltage. Follow appropriate safety precautions to avoid electrical shock. There are no system power controls on the 14-Slot Shelf. System power (-48 VDC from multiple power domains) is applied by an external power source at all times unless disabled or disconnected at the source.

To remove all input power from the 14-Slot Shelf, disable or disconnect all circuit breakers on all external power supplies for both PEMs.

Power Entry Modules (PEMs) and PEM Fuses

The two 14-Slot Shelf PEMs are located at the lower right and left corners at the rear of the Shelf. The PEM is a hot-swap unit. Power Entry Module fuses are mounted in the main body of each PEM, and are accessible only after the respective PEM has been removed from the Shelf.

WARNING Electrical Shock Hazard to Personnel. Although the PEM is a hot swap unit that can be removed and replaced while the 14-Slot Shelf continues to operate, all input power domains to the PEM being replaced must be turned off and disconnected before removal.

Removing a Power Entry Module

WARNING Electrical Shock Hazard to Personnel. Power is present at the PEM power terminals unless the external power source is turned off. Disable/disconnect all power domain circuit breakers in the OFF (O) position before completing any of the following steps. Failure to follow electrical safety precautions may result in personal injury.

CAUTION Electrostatic Discharge Hazard. Observe all ESD safety precautions while completing this procedure. Failure to follow ESD safety precautions could result in damage to the 14-Slot Shelf and equipment.

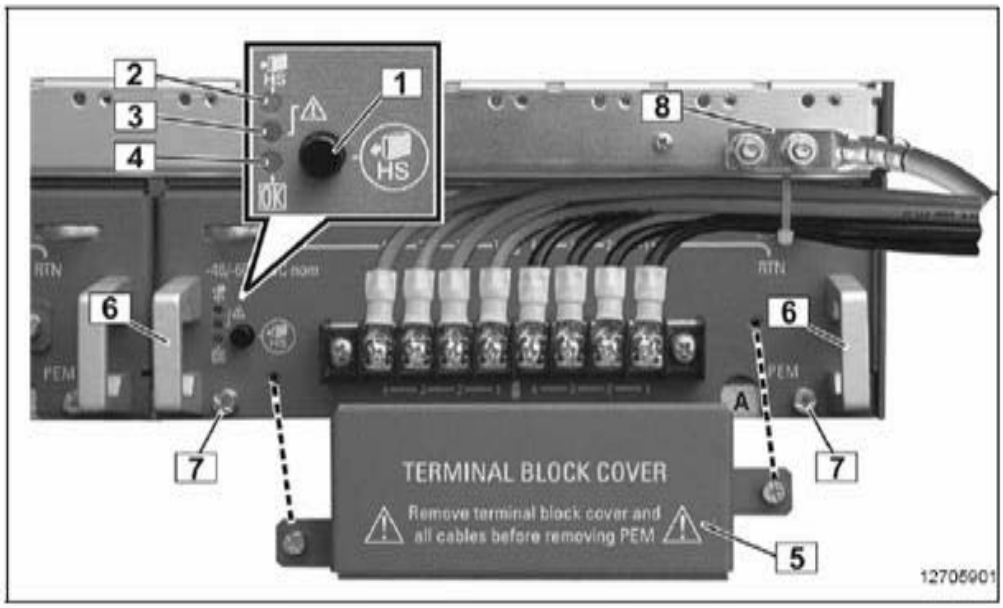
To remove a Power Entry Module (PEM) while the 14-Slot Shelf continues to operate using the redundant PEM, complete the following steps.

For the PEM to be removed do the following:

Step 1. Disable or disconnect all power domain circuit breakers in the OFF (O) position. The 14-Slot Shelf should continue to operate unless power has been removed from both PEMs.

Step 2. Press and release the H/S (Hot-Swap) button (#1, Figure 1-2) on the PEM to be removed. The blue hot-swap LED (#2, Figure 1-2) will flash intermittently while the request is being processed by the Shelf Manager (ShMM). The blue hot-swap LED will be constantly illuminated when it is safe to remove the PEM.

Figure 1-2Power Entry Module (PEM) A, Power Cables and Returns Attached



1	Hot Swap push button	5	Power Terminal cover
2	Hot Swap LED (blue)	6	Handle
3	PEM Alarm LED (red)	7	PEM fixing screws
4	PEM OK LED (green)	8	Shelf Ground Connection

Step 3. With the blue hot-swap LED steadily illuminated and all input power disabled/disconnected, remove the PEM Terminal Block Cover (#5, Figure 1-2.

Step 4. Remove and label each terminal block power and return cable for replacement hookup.

Step 5. Loosen both PEM fixing screws (#7, Figure 1-2).

Step 6. Using the two PEM handles (#6, Figure 1-2), pull the PEM from its mounting slot.

Step 7. Place the removed PEM in an anti-static bag for shipment.

Replacing a Power Entry Module

CAUTION Electrostatic Discharge Hazard. Observe all ESD safety precautions while completing this procedure. Failure to follow ESD safety precautions could result in damage to the 14-Slot Shelf and equipment.

To replace the PEM in the Shelf, complete the following steps:

Step 1. Holding the replacement PEM by its handles (#7, Figure 1-2) carefully insert the PEM into the empty PEM slot. Ensure that the PEM internal electrical connectors are aligned, and then use firm pressure to ensure that the PEM is properly seated in the connector.

Step 2. Tighten the PEM fixing screws that hold the PEM in the 14-Slot Shelf chassis (#7, Figure 1-2).

Step 3. Connect the power cables and return lines, ensuring that each power domain cable and return line is attached to the correct power terminal lug (Figure 1-2). It may be easier to connect all PEM cables before actually replacing the PEM into the 14-Slot Shelf chassis.

Step 4. Position the terminal block cover over the terminal block, then tighten the terminal block cover retaining screws (Figure 1-2).

Step 5. Enable all power supply circuit breakers supplying power to the replacement PEM.

Step 6. The green PEM OK LED (#4, Figure 1-2) should illuminate steadily. This completes the PEM replacement procedure.

Removing and Replacing Power Entry Module (PEM) Fuses

Power Entry Module (PEM) fuses for power domain input and return lines are mounted in each PEM, and are only accessible after the PEM is removed from the Shelf.

NOTE A PEM can be removed from the 14-Slot Shelf in hot-swap mode in order to remove and replace the fuses. The PEM can then be reinstalled while the 14-Slot Shelf continues to operate.

WARNING Electrical Shock Hazard. Power is present at the PEM power terminals unless the external power source is turned off. Disable/disconnect all power domain circuit breakers in the OFF (O) position for only the PEM to be removed before completing any of the following steps. Failure to follow electrical safety precautions may result in personal injury.

CAUTION Electrostatic Discharge Hazard. Observe all ESD safety precautions while completing this procedure. Failure to follow ESD safety precautions could result in damage to the 14-Slot Shelf and equipment.

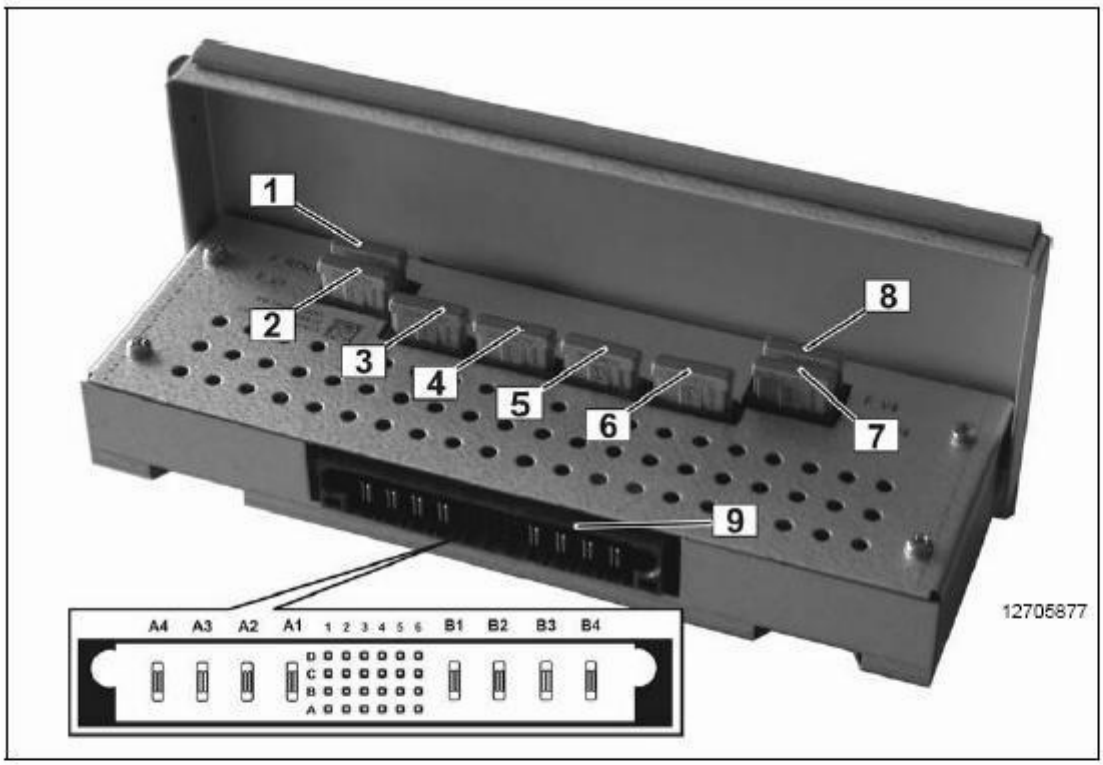
To remove and replace one or more fuses in a PEM, complete the following steps:

Step 1. Disable or disconnect all power supply domain circuit breakers in the OFF (O) position for the PEM to be removed that has the fuses that must be replaced. The 14-Slot Shelf should continue normal operation if desired with power supplied by the redundant PEM.

Step 2. Remove the respective PEM, following the removal procedures provided above.

Step 3. Remove and replace PEM fuses as required. Grasp each fuse and remove it by pulling upward. Press each replacement fuse into its mounting position by pressing down (see Figure 1-3).

Figure 1-3PEM with Fuses installed (Showing Backplane Connector Power Contacts)



1	30 A Fuse VRTN_1 (F101)	6	30 A Fuse -48V_3 (F302)
2	30 A Fuse -48V_1 (F102)	7	30 A Fuse VRTN_4 (F401)
3	30 A Fuse VRTN_2 (F201)	8	30 A Fuse -48V_4 (F402)
4	30 A Fuse VRTN_3 (F301)	9	PEM Backplane Connector
5	30 A Fuse -48V_2 (F202)		

Step 4. Replace the PEM, following the replacement procedures provided above.

Step 5. Re-enable or re-connect all power domain circuit breakers, and apply power to the reinstalled PEM.

Step 6. With all fuses either replaced or having tested as functional, the green PEM OK LED (#4, Figure 1-2) should illuminate steadily.

Step 7. This completes the PEM fuse removal and replacement procedure.

Shelf Manager

The 14-Slot Shelf contains two redundant Shelf Managers (ShMMs) as hot-swap FRUs. These units are located in the lower left and right corners at the front of the Shelf, and protrude into the air intake plenum. Both ShMMs are accessible from the outside front of the Shelf.

WARNING Potential Electrical Shock Hazard to Personnel. System power is applied to the 14-Slot Shelf at all times during this hot-swap removal and replacement procedure. Observe all electrical safety procedures while working on this hot-swap unit.

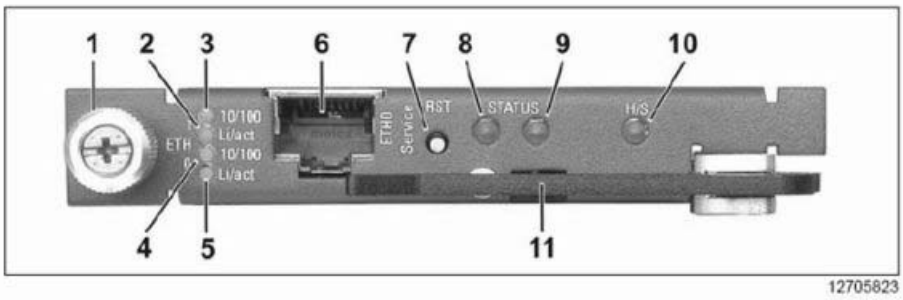
Removing a Shelf Manager Unit

CAUTION Electrostatic Discharge Hazard. Observe all ESD safety precautions while completing this procedure. Failure to follow ESD safety precautions could result in damage to the 14-Slot Shelf and equipment.

To remove a ShMM unit, complete the following steps:

Step 1. Loosen the ShMM fixing screw (#1, Figure 1-4), and pull the ShMM extraction handle approximately one-half of its full travel distance away from the ShMM front panel. The blue hot-swap (H/S) LED (#10, Figure 1-4) will flash intermittently as the request is being processed by the Shelf Manager, then illuminate solid when the unit is ready to be hot-swapped (removed).

Figure 1-4Shelf Manager (ShMM) Front Panel



1	Fixing screw	7	RESET push button
2	ETH 1 Link/Activity LED (green)	8	Shelf Manager Status LED (red)
3	ETH 1 Speed LED (yellow)	9	Shelf Manager Status LED (green)
4	ETH 0 Speed LED (yellow)	10	Hot Swap LED (blue)
5	ETH 0 Link/Activity LED (green)	11	Extraction handle
6	ETH 0 Ethernet Service Connector		

Step 2. When the blue H/S LED illuminates continuously, pull the extraction handle as far as it will go. This will release the ShMM unit from the 14-Slot Shelf.

Step 3. Remove the ShMM by pulling it out of its 14-Slot Shelf mounting slot, and place it in an anti-static bag.

Replacing a Shelf Manager

CAUTION Electrostatic Discharge Hazard. Observe all ESD safety precautions while completing this procedure. Failure to follow ESD safety precautions could result in damage to the 14-Slot Shelf and equipment.

To replace a ShMM unit, complete the following steps:

Step 1. Ensure that the replacement ShMM extraction handle (#11, Figure 1-4 is completely pulled out as far as it will go.

Step 2. Carefully insert the ShMM into the empty Shelf ShMM slot until the two ShMM backplane connectors align with the 14-Slot Shelf connectors.

Step 3. Press the extraction/insertion handle toward the ShMM unit front panel (Figure 1-4) until the unit is fully seated into the ShMM slot, and the extraction/insertion handle closes fully against the ShMM front panel.

Step 4. Tighten the ShMM fixing screw (#1, Figure 1-4) until it is snug.

Step 5. The blue H/S LED will illuminate with a long blink cycle while the replacement ShMM is activating itself. When the ShMM is active, the blue H/S LED will go out.

Step 6. After replacement, the green STATUS LED (#9, Figure 1-4) will illuminate continuously when the ShMM is active, and blink when the ShMM is operating in standby mode.

Ethernet Switch Blade

The Ethernet Switch Blade (typically installed in 14-Slot Shelf physical hub slots 7 and 8) is a hot-swap FRU and can be removed and replaced while the 14-Slot Shelf is fully operational.

WARNING Electrical Shock Hazard. System power is applied to the 14-Slot Shelf at all times during this hot-swap removal and replacement procedure. Observe all electrical safety procedures while working on this hot-swap unit.

Removing an Ethernet Switch Blade

CAUTION Possible data loss or network damage. Before removing an Ethernet Switch Blade, ensure that your VLAN topology will allow this Switch Blade to be removed without causing data loss or damage to the network.

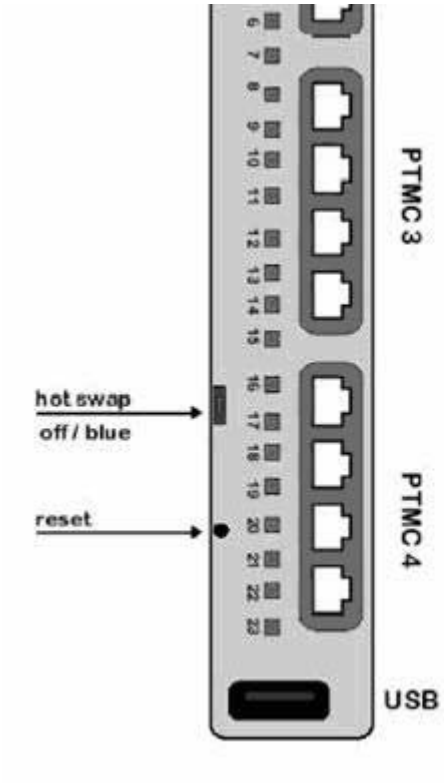
CAUTION Electrostatic Discharge Hazard. Observe all ESD safety precautions while completing this procedure. Failure to follow ESD safety precautions could result in damage to the 14-Slot Shelf and equipment.

To remove an Ethernet Switch Blade, complete the following steps:

Step 1. At the front of the 14-Slot Shelf blade cage, loosen the two retaining screws that secure the Ethernet Switch Blade front panel to the blade cage.

Step 2. Simultaneously pull both Ethernet Switch Blade extraction levers to the one-half open (extract) position only. The blue hot-swap LED located on the Ethernet Switch Blade front panel (Figure 1-5) will initially illuminate in a blinking mode. When the Ethernet Switch Blade can be safely removed, the blue hot-swap LED will illuminate continuously.

Figure 1-5Ethernet Switch Blade Front Panel (Lower Half), Showing Blue Hot Swap LED



Step 3. With the blue hot-swap LED illuminated continuously, simultaneously pull both extraction handles to the full-out extract position. This will disengage the Ethernet Switch Blade backplane connectors from the 14-Slot Shelf chassis.

Step 4. Carefully pull the Ethernet Switch Blade out of its mounting slot.

CAUTION Possible equipment damage due to excessive heat. If the Ethernet Switch Blade will not be immediately replaced, install a blade cage front filler panel in its place in order to maintain cooling air plenum integrity of the Shelf.

Step 5. Place the removed blade in an anti-static bag.

Replacing an Ethernet Switch Blade

CAUTION Electrostatic Discharge Hazard. Observe all ESD safety precautions while completing this procedure. Failure to follow ESD safety precautions could result in damage to the 14-Slot Shelf and equipment.

To replace an Ethernet Switch Blade, complete the following steps:

Step 1. Ensure that the slot that the Ethernet Switch Blade is to be installed in is empty. If a blade cage front filler panel has been installed for that slot, loosen the two filler panel retaining screws and remove the filler panel.

Step 2. Carefully align the Ethernet Switch Blade in its assigned slot, and slide the blade approximately half-way into the slot.

Step 3. Holding the two extraction levers in the fully extracted position (away from each other), carefully slide the Blade into the slot until the backplane connectors properly mate with the 14-Slot Shelf connectors and the blade is fully seated. A blade is fully seated when it touches the 14-Slot Shelf case up to the extractors.

Step 4. Push the extraction levers toward each other until they are seated flat against the front panel in order to complete the seating process, and secure the retention screws. The Ethernet Switch Blade will not operate unless the extraction levers are fully latched.

Step 5. The blue hot-swap LED will be blinking or off. This completes the replacement procedure.

HP bc2100 ATCA Server Blade

The HP bc2100 ATCA Server Blade is a hot-swap FRU and can be removed and replaced while the 14-Slot Shelf is fully operational.

WARNING Electrical Shock Hazard. System power is applied to the 14-Slot Shelf at all times during this hot-swap removal and replacement procedure. Observe all electrical safety procedures while working on this hot-swap unit.

Removing an HP bc2100 ATCA Server Blade

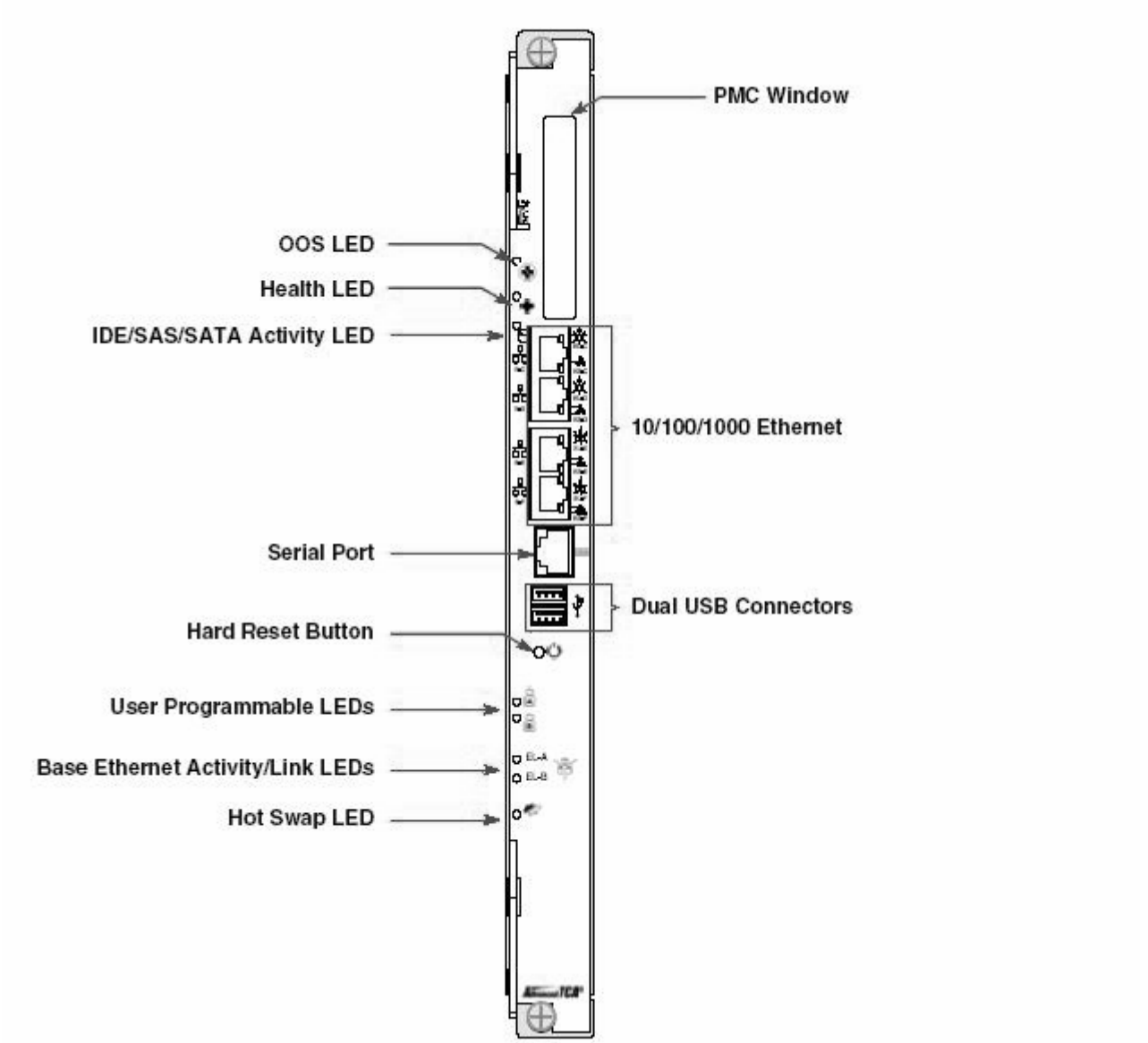
CAUTION Electrostatic Discharge Hazard. Observe all ESD safety precautions while completing this procedure. Failure to follow ESD safety precautions could result in damage to the 14-Slot Shelf and equipment.

To remove an HP bc2100 ATCA Server Blade, complete the following steps:

Step 1. Loosen the two retention screws on the HP bc2100 ATCA Server Blade front panel.

Step 2. Simultaneously pull both HP bc2100 ATCA Server Blade extraction levers to the one-half open (extract) position only. The blue hot-swap LED located on the HP bc2100 ATCA Server Blade front panel (Figure 1-6) will initially illuminate in a blinking mode. When the HP bc2100 ATCA Server Blade can be safely removed, the blue hot-swap LED will illuminate continuously.

Figure 1-6HP bc2100 ATCA Server Blade, Front Panel Indicators



Step 3. With the blue hot-swap LED illuminated continuously, pull both extraction handles to the full-out (extract) position. This will disengage the HP bc2100 ATCA Server Blade backplane connectors from the 14-Slot Shelf chassis.

Step 4. Carefully pull the HP bc2100 ATCA Server Blade out of its mounting slot.

CAUTION Possible equipment damage due to excessive heat. If the HP bc2100 ATCA Server Blade will not be immediately replaced, install a blade cage front filler panel in its place in order to maintain cooling air plenum integrity of the Shelf.

Step 5. Remove the SAS Disk Drive and all installed memory modules from the blade (removal and reinstallation procedures for the SAS Disk Drive and memory modules later in this chapter).

Step 6. Place the removed blade into an anti-static bag.

Replacing an HP bc2100 ATCA Server Blade

CAUTION Electrostatic Discharge Hazard. Observe all ESD safety precautions while completing this procedure. Failure to follow ESD safety precautions could result in damage to the 14-Slot Shelf and equipment.

To replace an HP bc2100 ATCA Server Blade, complete the following steps:

Step 1. Ensure that the slot that the HP bc2100 ATCA Server Blade is to be installed in is empty. If a blade cage front filler panel has been installed for that slot, loosen the two filler panel retaining screws and remove the filler panel.

Step 2. Carefully align the HP bc2100 ATCA Server Blade in its assigned slot, and slide the blade approximately half-way into the slot.

Step 3. Holding the two extraction levers in the fully extracted position (away from each other), carefully slide the Blade into the slot until the backplane connectors properly mate with the 14-Slot Shelf connectors and the blade is fully seated. A blade is fully seated when it touches the 14-Slot Shelf case up to the extractors.

Step 4. Push the extraction levers toward each other until they are seated flat against the front panel in order to complete the seating process, and secure the retention screws. The HP bc2100 ATCA Server Blade will not operate unless the extraction levers are fully latched.

Step 5. The blue hot-swap LED (Figure 1-6) will be blinking or off. This completes the replacement procedure.

Fan Trays

The 14-Slot Shelf has three interchangeable cooling fan trays that can be hot-swapped. The fan trays are individual plug-in modules, located at the top rear of the Shelf.

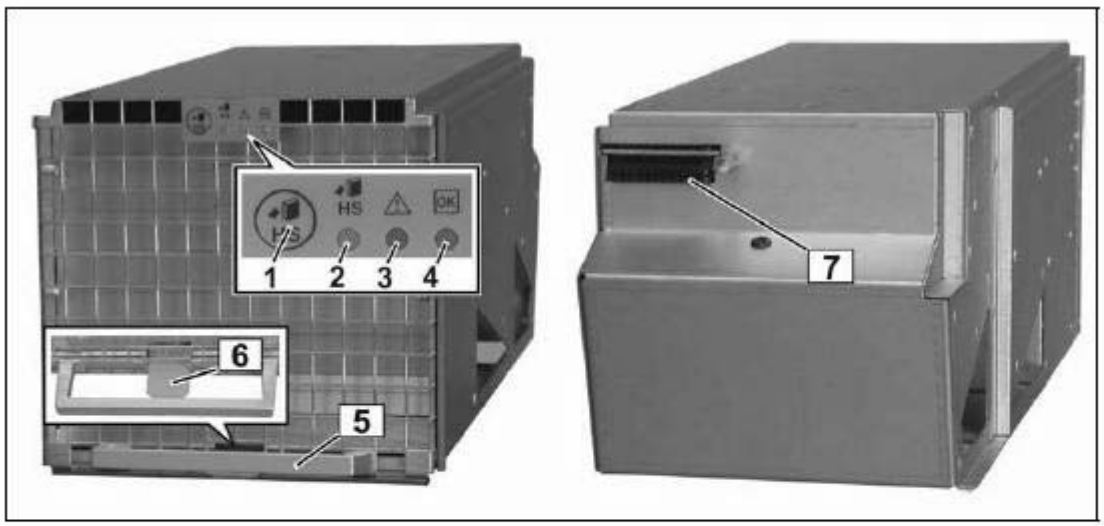
WARNING Electrical Shock Hazard. System power is applied to the 14-Slot Shelf at all times during this hot-swap removal and replacement procedure. Observe all electrical safety procedures while working on this hot-swap unit.

Removing a Fan Tray

To remove a fan tray, complete the following steps:

Step 1. Identify the fan tray to be removed. The fan tray LED display alarm LED (#3, Figure 1-7) may be illuminated.

Figure 1-7Fan Tray, Front and Back View



1	Hot Swap push button	5	Extraction handle
2	Hot Swap LED (blue)	6	Retention lever
3	Fan Tray Alarm LED (red)	7	Horizontal Board connector
4	Fan Tray OK LED (green)		

Step 2. While the 14-Slot Shelf is in normal operation, press and hold the hot-swap (HS) push button (#1, Figure 1-7) on the fan tray to be removed. The blue hot-swap LED (#2, Figure 1-7) will flash intermittently, then illuminate continuously. The fan tray is safe to remove when the blue HS LED is illuminated.

Step 3. Raise and hold the fan tray retention lever (#6, Figure 1-7) while pulling on the fan tray extraction handle (#5, Figure 1-7), and then remove the fan tray from the 14-Slot Shelf enclosure.

Step 4. Place the fan tray in an anti-static bag.

Replacing a Fan Tray

To replace a fan tray, complete the following steps:

Step 1. Carefully insert the fan tray into the empty fan tray enclosure of the Shelf.

Step 2. Ensure that the fan tray horizontal board connector (#7, Figure 1-7) engages with its horizontal board connector, and then press the fan tray into the enclosure until the retention lever locks the fan tray in place.

Step 3. As the fan tray begins operation, the green “Fan Tray OK” LED (#4, Figure 1-7) should illuminate continuously.

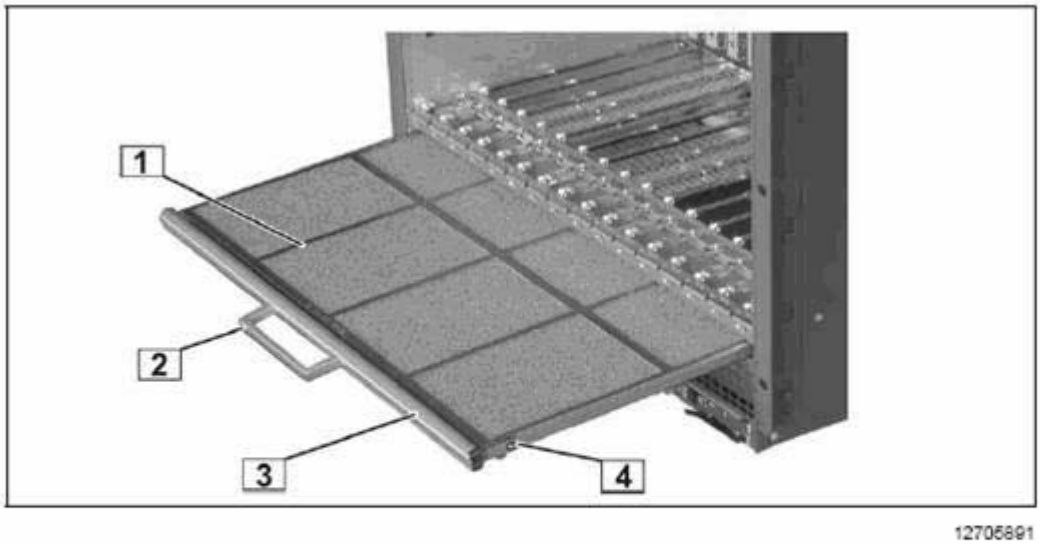
All “FAN” and “OK” LED indicators on the Alarm Display Panel should be illuminated with the system operating.

Air Filter

The 14-Slot Shelf air filter is located near the bottom front of the Shelf, immediately beneath the blade slots (Figure 1-8). The air filter is a hot-swap unit, and can be removed and replaced while the 14-Slot Shelf is in normal operation. There is no voltage present at the air filter element and filter tray.

WARNING Electrical Shock Hazard. System power is applied to the 14-Slot Shelf at all times during this hot-swap removal and replacement procedure. Observe all electrical safety procedures while working on this hot-swap unit.

Figure 1-8 Filter Tray Extended, 14-Slot Shelf Front View



1	Filter Element	3	Filter Tray
2	Handle	4	Spring mounted ball lock

Air Filter Element Replacement Schedule

The air filter element must be removed and replaced a minimum of every three months when operating in a computer room with a raised-floor environment. Your environment may require a more frequent change schedule.

Removing the Air Filter

IMPORTANT When the air filter tray is removed during system operation, the removal event is recorded in the System Event Log (SEL) of the 14-Slot Shelf as a default reaction. Note that the ShMM software can be pre-set to react to this event.

To remove the 14-Slot Shelf replaceable air filter, complete the following steps:

Step 1. Using the filter tray handle (Figure 1-8), pull the filter tray out, and remove it from the 14-Slot Shelf.

Step 2. Remove the air filter element from the filter tray and discard the used element.

Replacing the Air Filter

To replace the air filter, complete the following steps:

Step 1. Install the new air filter element in the filter tray, as it is shown in Figure 1-8.

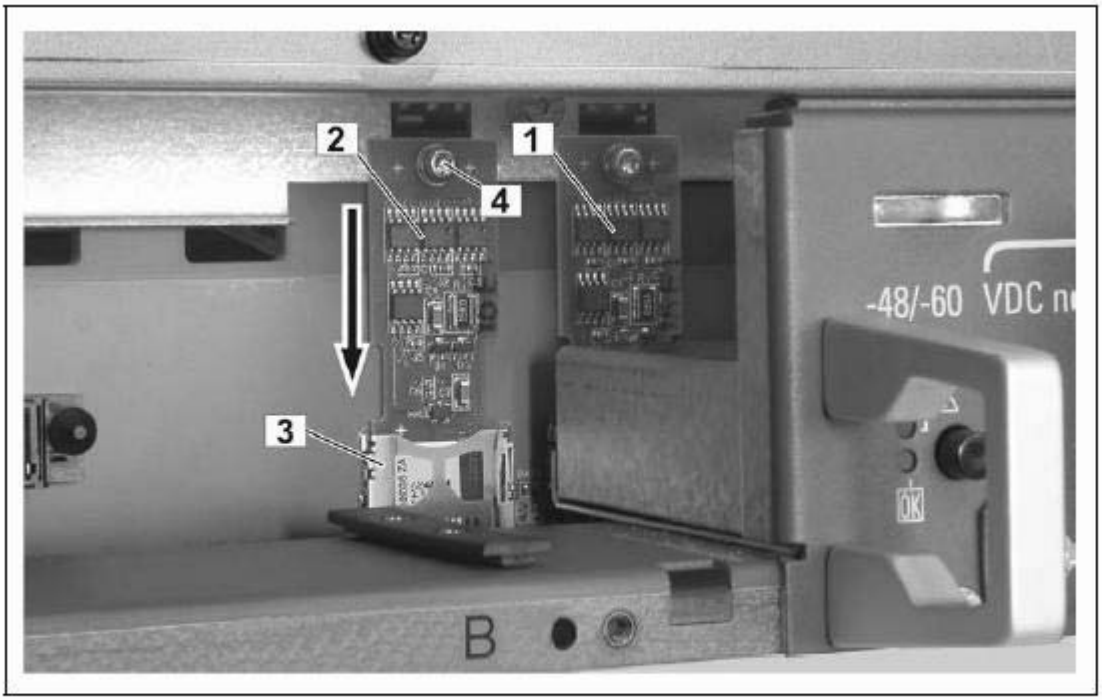
Step 2. Insert the filter tray into the two filter tray guide rails located inside the 14-Slot Shelf filter tray compartment (Figure 1-8) until the spring mounted ball lock (#4, Figure 1-8) engages.

Backplane SEEPROM Assemblies

The redundant 14-Slot Shelf Backplane SEEPROM Assemblies contain chassis configuration information for the system, and are power-off, cold-swap FRUs. Backplane SEEPROM Assemblies (also known as Chassis Data Modules CDM1 and CDM2) are small, pluggable circuit board modules that are mounted on the back side of the 14-Slot Shelf chassis backplane. They can be accessed after removing the Power Entry Modules (PEMs) mounted in front of them, as shown in Figure 1-9.

IMPORTANT The redundant SEEPROMs contain identical configuration information for the 14-Slot Shelf system. When a single Backplane SEEPROM Assembly is replaced with a new blank SEERPOM Assembly from stock, the Shelf Manager (ShMM) will copy all 14-Slot Shelf system configuration information from the remaining installed SEEPROM into the new replacement SEEPROM, thereby maintaining redundancy.

Figure 1-9 Backplane SEEPROM Assemblies (PEM B Removed)



1	CDM 1	3	Slot
2	CDM 2	4	Fixing screw

Removing a 14-Slot Shelf SEEPROM Assembly

WARNING Electrical Shock Hazard to Personnel. Shut down all normal operation of the 14-Slot Shelf and disable/disconnect all external power supply power domain circuit breakers in the OFF (O) position before completing any of the following steps. Failure to disable/disconnect all power supplied to the 14-Slot Shelf at the power source may result in personal injury.

CAUTION Electrostatic Discharge Hazard. Observe all ESD safety precautions while completing this procedure. Failure to follow ESD safety precautions could result in damage to the 14-Slot Shelf and equipment.

To remove a 14-Slot Shelf SEEPROM assembly, complete the following steps:

Step 1. Remove both PEMs in order to provide maximum physical access to the defective SEEPROM.

Step 2. Carefully remove the Backplane SEEPROM Assembly fixing screw (#4, Figure 1-9) using an applicable Torx head screw driver. Note that the Torx drive mounting screw is not captive, and can be easily dropped inside the chassis.

Step 3. Push the SEEPROM Assembly board in the direction of the arrow in Figure 1-9 to release the locking mechanism in the mounting slot, and remove the SEERPOM Assembly from the backplane.

Step 4. Place the SEEPROM Assembly containing the defective SEEPROM into an anti-static bag.

Replacing a 14-Slot Self SEEPROM Assembly

WARNING Electrical Shock Hazard to Personnel. Shut down all normal operation of the 14-Slot Shelf and disable/disconnect all external power supply power domain circuit breakers in the OFF (O) position before completing any of the following steps. Failure to disable/disconnect all power supplied to the 14-Slot Shelf at the power source may result in personal injury.

CAUTION Electrostatic Discharge Hazard. Observe all ESD safety precautions while completing this procedure. Failure to follow ESD safety precautions could result in damage to the 14-Slot Shelf and equipment.

To replace a Backplane SEEPROM Assembly, complete the following steps:

Step 1. Ensure that the PEMs have been removed, and that the required SEEPROM Assembly mounting slot is open and unobstructed (see Figure 1-9).

Step 2. Hold the replacement SEEPROM Assembly vertically by its edges so that the fixing screw hole is at the top (in the same orientation as shown in Figure 1-9). Slide the SEEPROM Assembly into its backplane mounting slot, as shown in Figure 1-9, so that the fixing screw hole is aligned with the fixing screw threads on the backplane.

Step 3. Ensure that the new SEEPROM Assembly is locked in place in its mounting slot, then insert and tighten the Torx drive mounting screw (Figure 1-9).

Step 4. Reinstall the PEMs.

Step 5. This completes the SEEPROM Assembly replacement procedure.

IMPORTANT If replacing a single backplane SEEPROM Assembly, the active ShMM will copy all existing 14-Slot Shelf system configuration information from the remaining installed SEEPROM Assembly into the new replacement SEEPROM Assembly when power is applied to the 14-Slot Shelf.

Alarm Display Panel and Alarm Connector Panel

This section provides information on removing and replacing the Alarm Display Panel and the Alarm Connector Panel.

Removing and Replacing the Alarm Display Panel

The Alarm Display Panel is a hot-swap FRU, and is mounted in the upper, left front corner of the Shelf. There is no hot-swap button or blue hot-swap LED for the Alarm Display Panel.

Removing the Alarm Display Panel

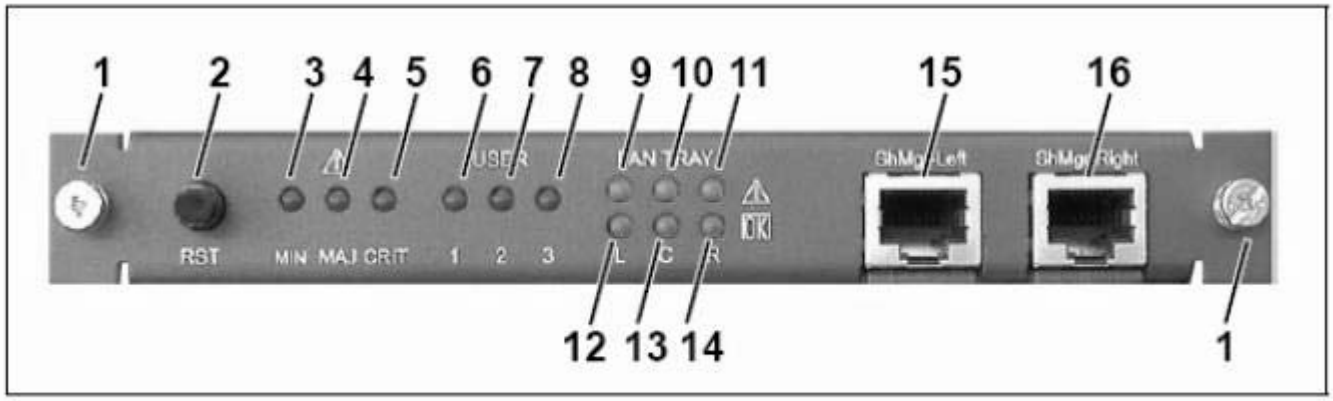
WARNING Electrical Shock Hazard to Personnel. Shut down all normal operation of the 14-Slot Shelf and disable/disconnect all external power supply power domain circuit breakers in the OFF (O) position before completing any of the following steps. Failure to disable/disconnect all power supplied to the 14-Slot Shelf at the power source may result in personal injury.

CAUTION Electrostatic Discharge Hazard. Observe all ESD safety precautions while completing this procedure. Failure to follow ESD safety precautions could result in damage to the 14-Slot Shelf and equipment.

To remove the Alarm Display Panel, complete the following steps:

Step 1. Loosen the fixing thumb screws holding the Alarm Display Panel (Figure 1-10) to the Shelf.

Figure 1-10Alarm Display Panel, Front View



1	Fixing screw	9	LED Fan Tray Left Alarm (red)
2	Alarm Cutoff push button (RST)	10	LED Fan Tray Center Alarm (red)
3	LED Min. Alarm (yellow)	11	LED Fan Tray Right Alarm (red)
4	LED Maj. Alarm (amber)	12	LED Fan Tray Left OK (green)
5	LED Crit. Alarm (red)	13	LED Fan Tray Center OK (green)
6	User definable LED 1 (red)	14	LED Fan Tray Right OK (green)
7	User definable LED 2 (green)	15	Serial Console Interface primary Shelf Manager (Left)
8	User definable LED 3 (amber)	16	Serial Console Interface secondary Shelf Manager (Right)

Step 2. Pull the Alarm Display Panel unit from the chassis and place it in an anti-static bag.

Replacing the Alarm Display Panel

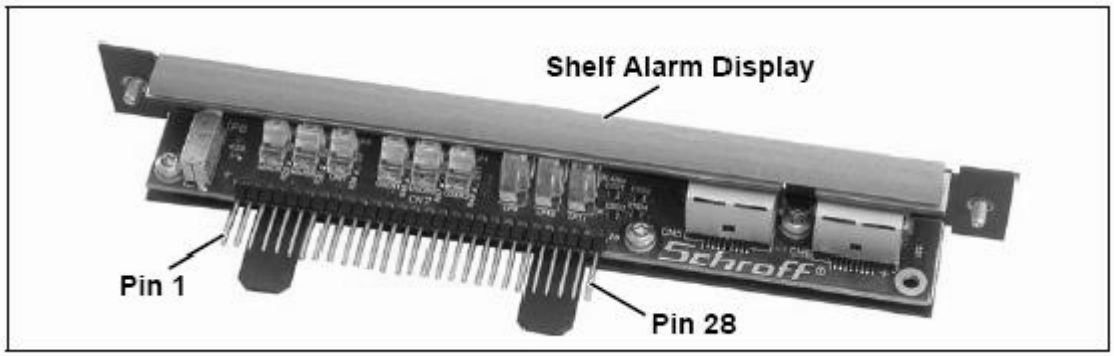
WARNING Electrical Shock Hazard to Personnel. Shut down all normal operation of the 14-Slot Shelf and disable/disconnect all external power supply power domain circuit breakers in the OFF (O) position before completing any of the following steps. Failure to disable/disconnect all power supplied to the 14-Slot Shelf at the power source may result in personal injury.

CAUTION Electrostatic Discharge Hazard. Observe all ESD safety precautions while completing this procedure. Failure to follow ESD safety precautions could result in damage to the 14-Slot Shelf and equipment.

To replace an Alarm Display Panel, complete the following steps:

Step 1. Carefully insert the Alarm Display Panel assembly into its chassis mounting slot, using the fiber board tabs to align the display connector pins (Figure 1-11).

Figure 1-11Alarm Display Panel, Rear View



Step 2. Ensure that all connector pins are properly aligned with the 14-Slot Shelf receptacle. Using firm pressure, push the Alarm Display Panel into the chassis connector until it is fully seated.

Step 3. Tighten the two retaining thumb screws to secure the Alarm Display Panel to the 14-Slot Shelf chassis.

Removing and Replacing the Alarm Connector Panel

The Alarm Connector Panel is a hot-swap FRU, and is mounted in the upper, right front corner of the Shelf.

WARNING Electrical Shock Hazard to Personnel. Shut down all normal operation of the 14-Slot Shelf and disable/disconnect all external power supply power domain circuit breakers in the OFF (O) position before completing any of the following steps. Failure to disable/disconnect all power supplied to the 14-Slot Shelf at the power source may result in personal injury.

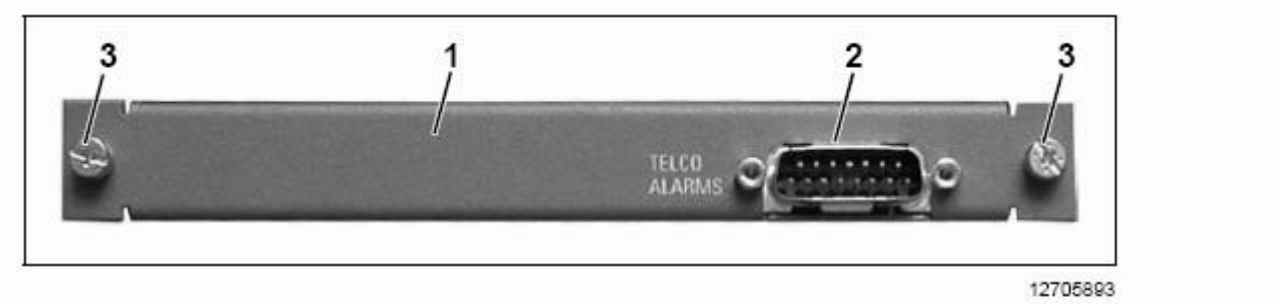
CAUTION Electrostatic Discharge Hazard. Observe all ESD safety precautions while completing this procedure. Failure to follow ESD safety precautions could result in damage to the 14-Slot Shelf and equipment.

Removing the Alarm Connector Panel

To remove the Alarm Connector Panel, complete the following steps:

Step 1. Loosen the retaining thumb screws holding the Alarm Connector Panel to the 14-Slot Shelf chassis (Figure 1-12).

Figure 1-12Alarm Connector Panel, Front View



1	Shelf Alarm Panel (SAP)	3	Fixing screw
2	Telco Alarm Connector (DB15-male)		

Step 2. Pull the Alarm Connector Panel assembly from the 14-Slot Shelf chassis and place it in an anti-static bag.

Replacing the Alarm Connector Panel

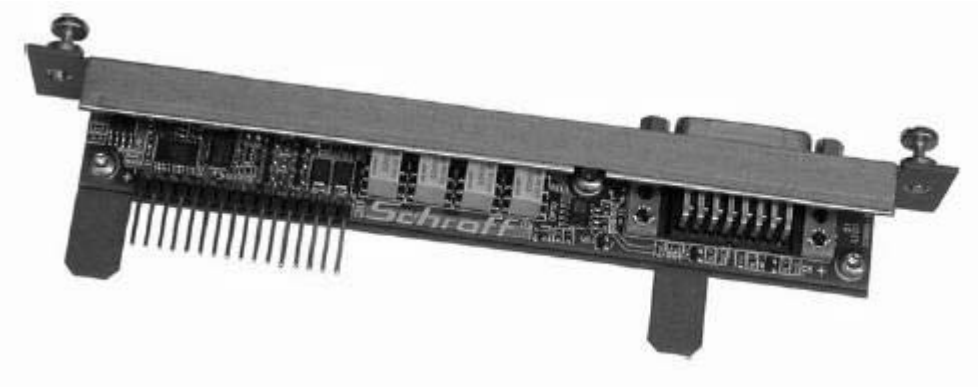
WARNING Electrical Shock Hazard to Personnel. Shut down all normal operation of the 14-Slot Shelf and disable/disconnect all external power supply power domain circuit breakers in the OFF (O) position before completing any of the following steps. Failure to disable/disconnect all power supplied to the 14-Slot Shelf at the power source may result in personal injury.

CAUTION Electrostatic Discharge Hazard. Observe all ESD safety precautions while completing this procedure. Failure to follow ESD safety precautions could result in damage to the 14-Slot Shelf and equipment.

To replace an Alarm Connector Panel, complete the following steps:

Step 1. Carefully insert the Alarm Connector Panel assembly into its chassis mounting slot, using the fiber board tabs to align the mounting connector pins (see Figure 1-13).

Figure 1-13Alarm Connector Panel, Rear View



Step 2. Ensure that all connector pins are properly aligned with the 14-Slot Shelf receptacle. Using firm pressure, push the Alarm Connector Panel into the chassis connector until it is fully seated.

Step 3. Tighten the two retaining thumb screws to secure the Alarm Connector Panel to the chassis.

Cable Trays and Rack Mounting Flange Kit

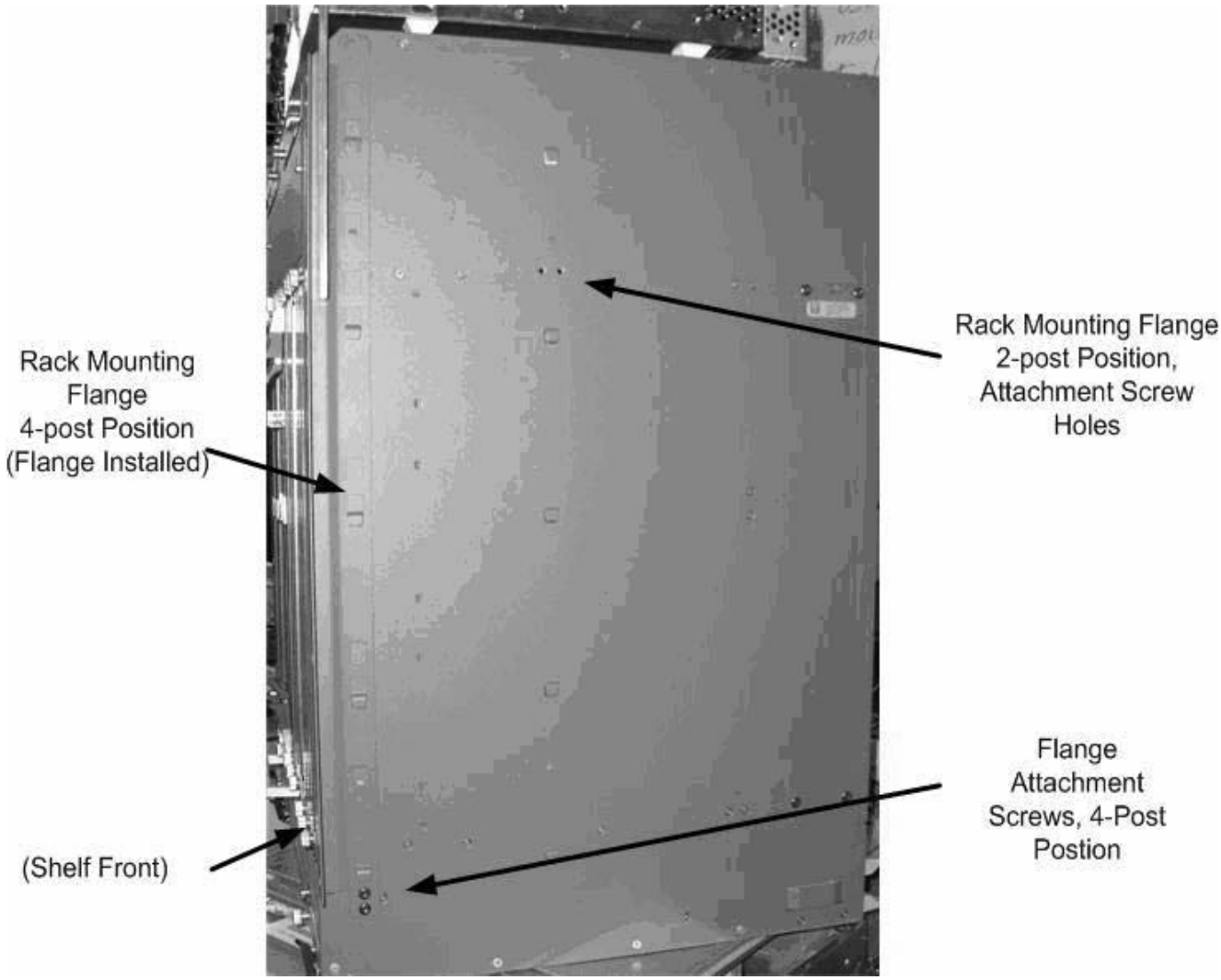
This section provides procedures for removing and replacing the 14-Slot Shelf rack mount Flanges, front and rear Cable Trays, and front and rear blade cage Filler Panels.

Removing and Replacing Rack Mount Flanges

To remove the 14-Slot Shelf rack mounting Flanges, complete the following steps:

Step 1. The rack mounting Flanges can be mounted for installing the 14-Slot Shelf in either the 4-post equipment rack or a 2-post equipment rack (see Figure 1-14). In either case, the removal procedures are identical.

Figure 1-14 Rack Mount Flange Positions



Step 2. Remove the two mounting flanges from the mounting position (Figure 1-14) by first removing the two screws that secure each flange to the outside of the 14-Slot Shelf side panels.

Step 3. Slide each flange down until the flanges drop out of the five retaining clips that hold them to the Shelf.

Step 4. Set the flanges aside.

To replace the rack mounting flanges, complete the following steps:

Step 1. Position each flange over the five retaining clips on each side of the 14-Slot Shelf chassis for either the 4-post or 2-post mounting position, as required for your installation. Ensure that the flange retaining clips on the chassis protrude into the five rectangular-shaped cut-out openings in the flange body.

Step 2. Ensure that the protruding right-angle flange surfaces that mate to the equipment rack are oriented toward the front of the 14-Slot Shelf blade cage (see Figure 1-14, flange mounted in position for 4-post rack installation).

Step 3. Slide each flange up under the flange retaining clips until the flanges are securely seated under each clip. The rack mounting flange screw holes should now be aligned with mating threaded receptacles in the 14-Slot Shelf body.

Step 4. Insert two retaining screws into each rack mounting flange and tighten.

Step 5. The 14-Slot Shelf is now ready to be mounted into a four-post equipment rack.

Removing and Replacing Cable Trays

To remove the Shelf front and rear cable trays, complete the following steps:

Step 1. Remove the mounting screws that fix the front or rear cable tray to the Shelf (Figure 1-15 and Figure 1-16).

Figure 1-1514-Slot Shelf, Front View (Blade Cage Empty)

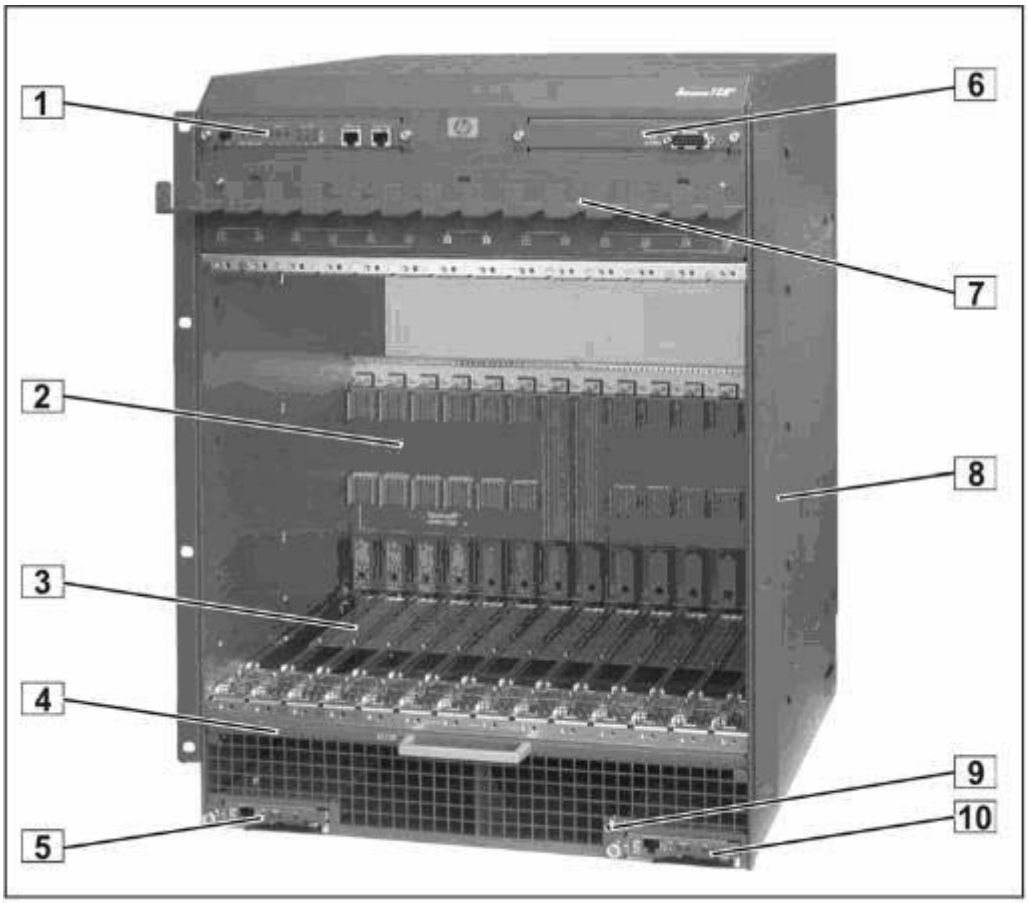
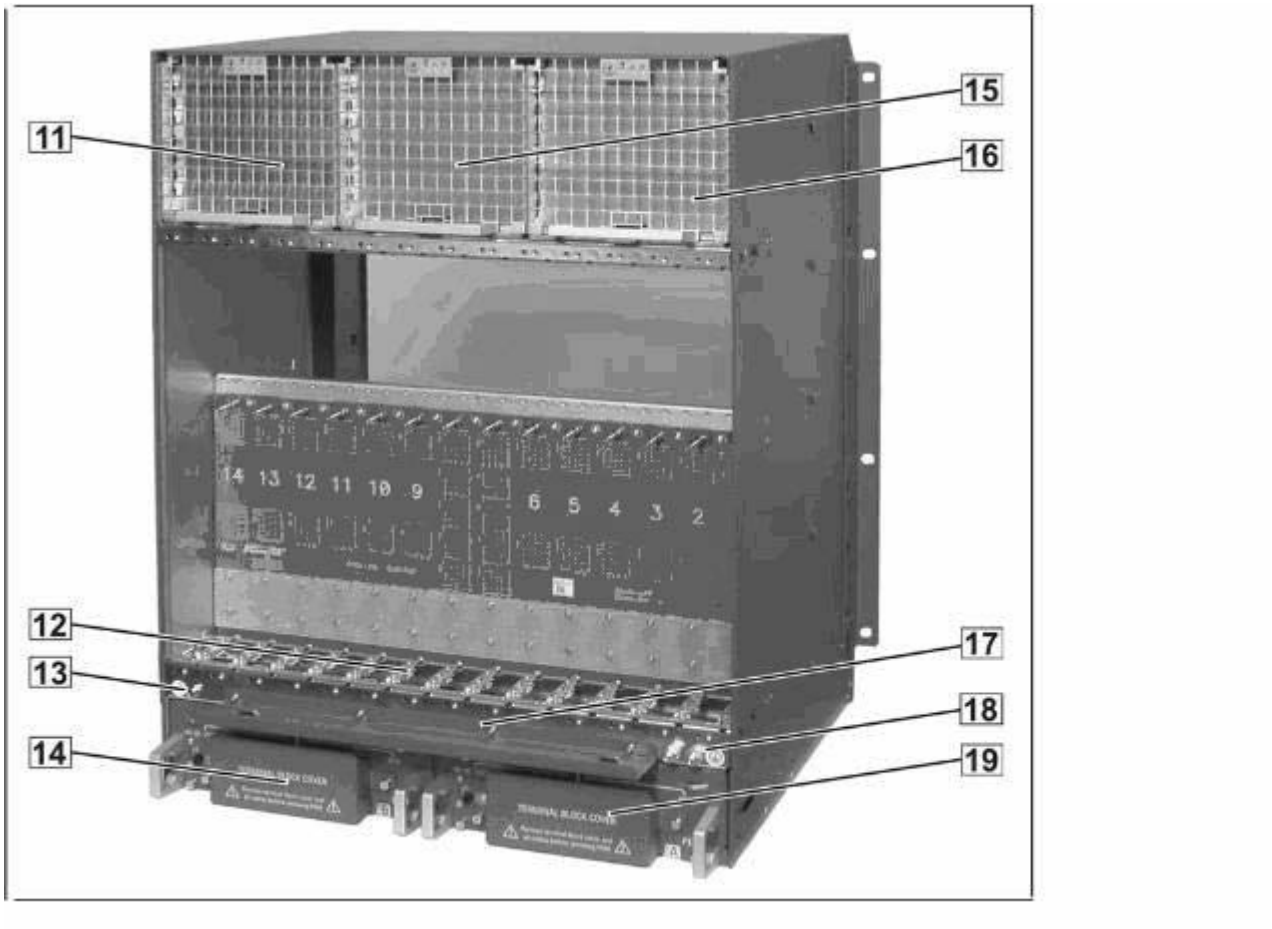


Figure 1-16 14-Slot Shelf, Rear View (Blade Cage Empty)



Step 2. Set the front/rear cable trays and attaching screws aside.

To replace the 14-Slot Shelf front and rear cable trays, complete the following steps:

Step 1. Position the front cable tray (upper front of the blade cage, shown as #7 in Figure 1-15), and insert and tighten the tray mounting screws.

Step 2. Position the rear cable tray (lower rear of blade cage, just above the PEMs), and insert and tighten the tray mounting screws (see #17, Figure 1-16 for tray location).

14-Slot Shelf Chassis and Backplane

Although the 14-Slot Shelf chassis with backplane is replaced as an individual FRU, the replacement 14-Slot Shelf chassis and backplane will contain a full complement of chassis components when delivered. These components include:

- Both Shelf Management Modules, or “Shelf Managers” (ShMMs)
- Both Power Entry Modules (PEMs)
- All Fan Modules
- Air Filter Tray and Filter Element
- The Alarm Display Panel
- The Alarm Connector Panel
- Both Chassis Data Modules (Backplane SEEPROM Assemblies)

CAUTION Possible 14-Slot Shelf chassis data loss. The Chassis Data Modules must be removed from the defective 14-Slot Shelf and installed in the replacement 14-Slot Shelf chassis in order to retain your 14-Slot Shelf chassis configuration data.

Removing the 14-Slot Shelf Chassis and Backplane

CAUTION Possible 14-Slot Shelf chassis configuration data loss. In order to retain original chassis configuration data when the 14-Slot Shelf chassis and backplane are replaced as a FRU, the original 14-Slot Shelf Backplane SEEPROM Assemblies must be removed from the defective chassis and installed in the replacement 14-Slot Shelf chassis.

CAUTION Electrostatic Discharge Hazard. Observe all ESD safety precautions while completing this procedure. Failure to follow ESD safety precautions could result in damage to the 14-Slot Shelf and equipment.

NOTE Removing and replacing the 14-Slot Shelf chassis is a cold-swap procedure. There are no hot swap requirements for this procedure.

To remove the chassis and backplane from the 14-Slot Shelf system, complete the following steps (refer to Figure 1-17 and Figure 1-18):

Figure 1-17 14-Slot Shelf, Front View (Blade Cage Empty)

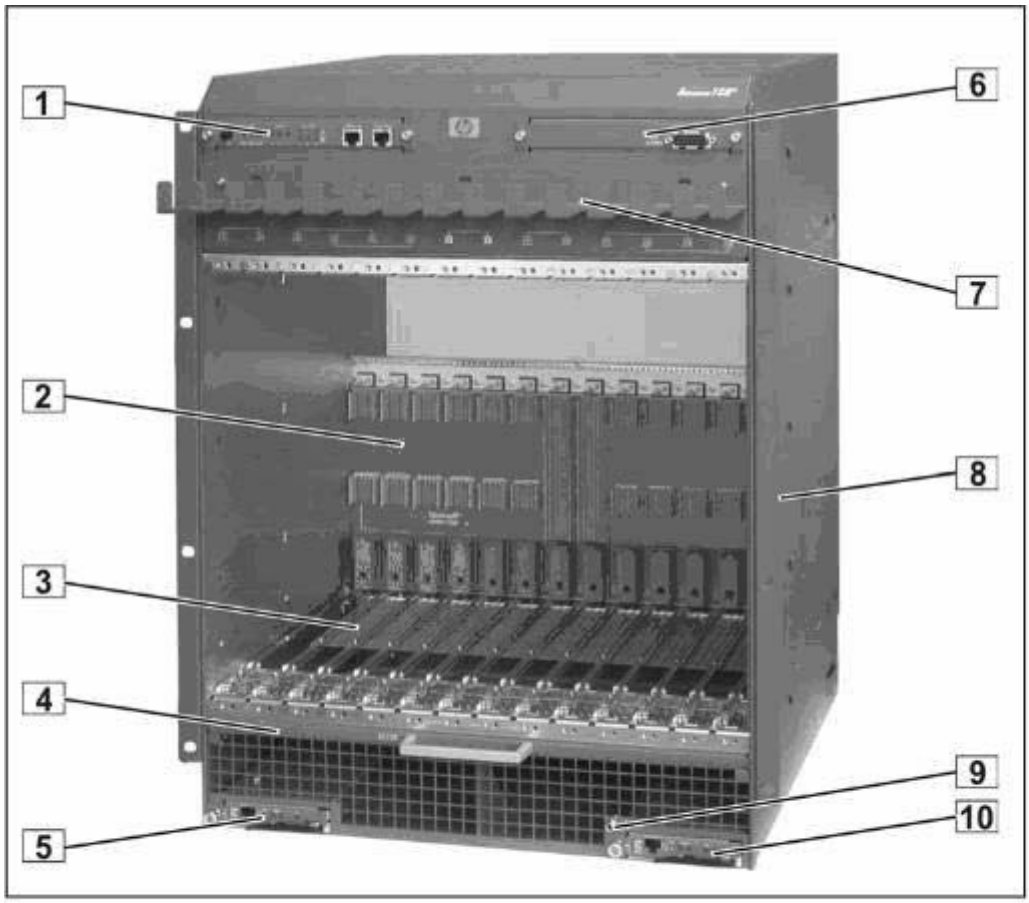
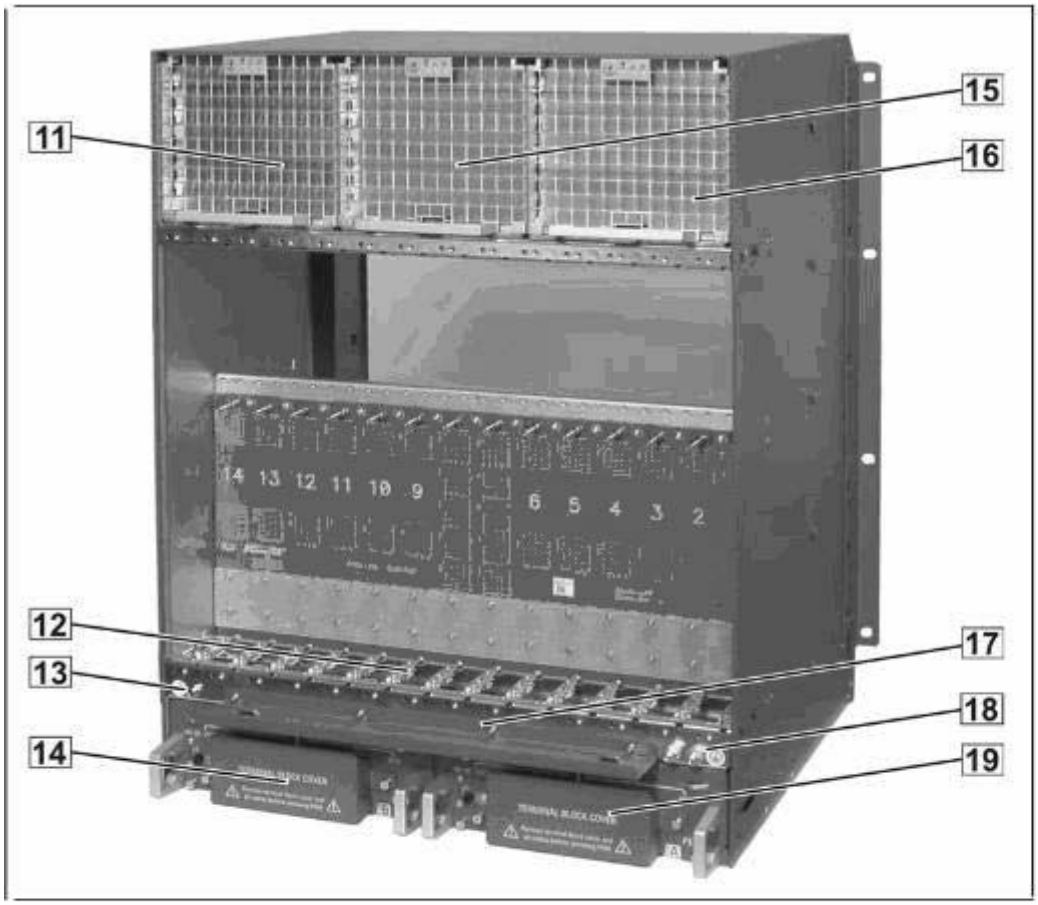


Figure 1-18 14-Slot Shelf, Rear View (Blade Cage Empty)



Step 1. Shut down normal operation of the HP bh5700ATCA 14-Slot Blade Server.

Step 2. Disconnect/disable all external input power sources to both PEMs.

WARNING Electrical Shock Hazard. Power is always present at the PEM power terminals unless the external power source is turned off. Disable/disconnect all power domain circuit breakers in the OFF (O) position before completing any of the following steps. Failure to follow electrical safety precautions may result in personal injury.

Step 3. Record all current console and Ethernet cable hookup configurations for all installed blades and the Shelf, and set aside as a reference for configuring the replacement Shelf.

Step 4. Disconnect all external power supply input cables from the PEMs and protective earth ground cables from the 14-Slot Shelf chassis.

Step 5. Remove all Ethernet Switch Blades, HP bc2100 ATCA Server Blades, and any other installed blades from the 14-Slot Shelf blade cage, and individually set aside in anti-static bags for reinstallation in the replacement chassis (follow removal procedures in “Ethernet Switch Blade” on page 36).

Step 6. Remove all additional blades and filler panels from the blade cage and set aside for installation in the replacement chassis.

Step 7. If the 14-Slot Shelf is currently installed in a rack, use a mobile mechanical lifting device to support and transport the 14-Slot Shelf to an anti-static working area for further disassembly.

WARNING Heavy lift hazard. A fully loaded 14-Slot Shelf can weight as much as 200 lbs (90 kg). Ensure that the 14-Slot Shelf is secure and balanced on the mechanical lift before removing it from the equipment rack.

Step 8. Remove both PEMs by following the procedures in “Power Entry Modules (PEMs) and PEM Fuses” on page 30. Set individual PEMs aside in anti-static bags for reinstallation into this chassis following replacement of the Backplane SEEPROM Assemblies.

Step 9. Remove both Backplane SEEPROM Assemblies, and set aside in anti-static bags for installation into the replacement chassis (see removal procedures in “Backplane SEEPROM Assemblies” on page 46).

Step 10. Set the defective chassis aside until replacement Backplane SEEPROM Assemblies have been installed in preparation for return of the chassis to Hewlett-Packard.

IMPORTANT Ensure that the two replacement Backplane SEEPROM Assemblies have been installed, and that PEMs have been reinstalled in the defective 14-Slot Shelf chassis before it is returned to Hewlett-Packard.

Replacing the 14-Slot Shelf Chassis with Backplane

CAUTION Electrostatic Discharge Hazard. Observe all ESD safety precautions while completing this procedure. Failure to follow ESD safety precautions could result in damage to the 14-Slot Shelf and equipment.

NOTE Replacing the 14-Slot Shelf chassis is a completely cold- swap procedure. There are no hot-swap requirements for this procedure.

To replace a 14-Slot Shelf Chassis with Backplane, complete the following preparation and replacement steps:

Step 1. Ensure that the replacement 14-Slot Shelf chassis is located in an anti-static work area.

Step 2. If the replacement chassis is to be installed in a rack, ensure that the rack mounting flanges are installed in the correct position. Position rack mounting flanges for either the 4-post or the 2-post rack, as required.

Step 3. Install the front and rear 14-Slot Shelf cable trays using the existing cable tray mounting screws.

Step 4. Remove both PEMs from the replacement chassis.

Step 5. Remove both Backplane SEEPROM Assemblies from the replacement chassis and set aside for installation into the defective chassis for return to Hewlett-Packard.

Step 6. Install the two Backplane SEEPROM Assemblies you removed from the defective chassis into the replacement chassis.

Step 7. Reinstall both PEMs in the replacement chassis. Do not connect input power cables and earth protective grounds until the 14-Slot Shelf has been installed in its operating location.

Step 8. If the replacement 14-Slot Shelf chassis is to be installed in an equipment rack, place the chassis on a mobile mechanical lifting device for transport and support during installation of the into the rack.

WARNING Heavy lift hazard. A fully loaded 14-Slot Shelf can weight as much as 200 lbs (90 kg). Ensure that the 14-Slot Shelf is secure and balanced on the mechanical lift when installing the 14-Slot Shelf in a rack.

Step 9. Install the replacement 14-Slot Shelf chassis into its equipment rack location and secure all rack mounting flange screws.

Step 10. Install all blades in the blade cage that were removed from the original 14-Slot Shelf chassis.

Step 11. Install all blade cage front and rear slot Filler Panels to fill all open blade cage slots. Ensure that there are no open slots remaining in the blades cage front or back in order to maintain cooling air plenum integrity.

WARNING Electrical Shock Hazard. Power is always present at the external power supply cables and PEM power terminals unless the external power source is turned off. Disable/disconnect all external power supply domain circuit breakers in the OFF (O) position before completing any of the following steps. Failure to follow electrical safety precautions may result in personal injury.

Step 12. Reconnect the protective earth ground lead from the installation building to the replacement 14-Slot Shelf chassis (see Figure 1-2).

Step 13. Reconnect all power supply domain leads and return cables to the replacement PEMs (see Figure 1-2).

Step 14. Verify that all FRUs have been installed in the replacement 14-Slot Shelf chassis and backplane, and that the cooling air plenum integrity is intact (specifically, that there are no front or rear open slots in the blade cage).

Step 15. The replacement 14-slot Shelf chassis, components, and blades should now be ready for you to re-configure all interconnect cables as required by your VLAN topology.

CAUTION Possible management control or data loss. Ensure the Jumpers JB141-144 on both ShMM carriers boards are installed in the position required by your specific VLAN topology. Refer to the *HP bh5700 ATCA 14-Slot Blade Server, Installation Guide, A Sample VLAN Topology, Shelf Manager Configuration – eth0* for information of positioning these jumpers.

Step 16. The replacement 14-Slot Shelf should be ready to reapply external power and resume normal operation.

HP bc2100 ATCA Server Blade Hard Disk Drive

This section provides information on removing and replacing the HP bc2100 ATCA Server Blade optional Hard Disk Drive and Mounting Kit.

Removing the Hard Disk Drive and Mounting Kit

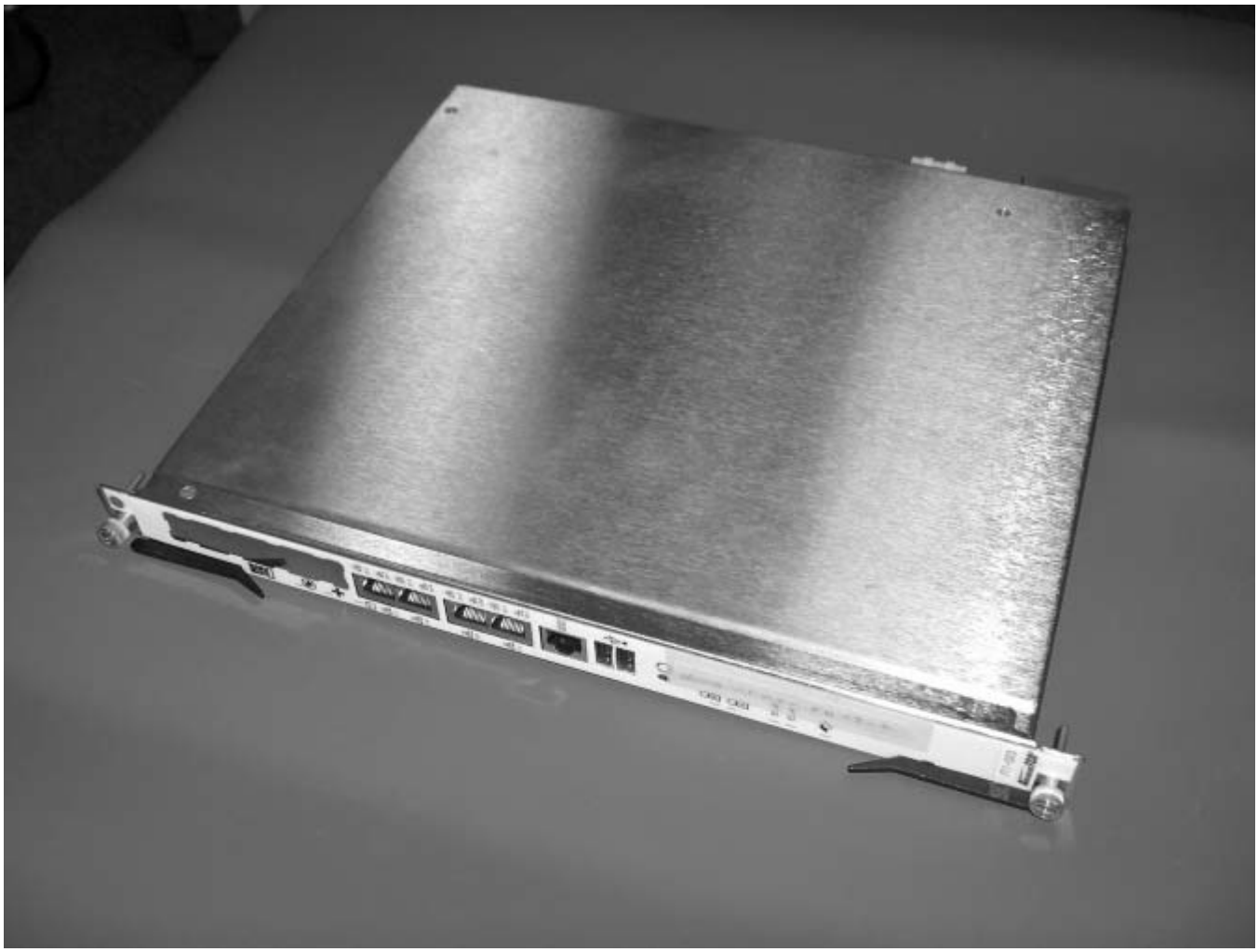
CAUTION Electrostatic Discharge Hazard. Observe all ESD safety precautions while completing this procedure. Failure to follow ESD safety precautions could result in damage to the 14-Slot Shelf and equipment.

To remove the Hard Disk Drive (HDD) and Mounting Kit, complete the following steps:

Step 1. Following the blade hot-swap procedures, remove the HP bc2100 ATCA Server Blade from the shelf.

Step 2. Lay the Server Blade flat on its left side on an ESD-safe working surface, with the blade front panel facing you (Figure 1-19). Ensure that the blade backplane connector (blue color) is facing away from you, and located on the far right corner of the blade as it lays flat.

Figure 1-19 HP bc2100 ATCA Server Blade, Access Cover Panel Installed



Step 3. Remove the four countersunk retaining screws that secure the blade cover panel, and remove the access cover panel. Set the cover panel and the retaining screws aside for reuse.

Step 4. Locate the HDD (Figure 1-20), and remove the four pan head screws holding the HDD mounting brackets to the blade circuit board stand-off posts. Set the mounting bracket pan head screws aside for reuse during replacement.

Figure 1-20 HDD Installed

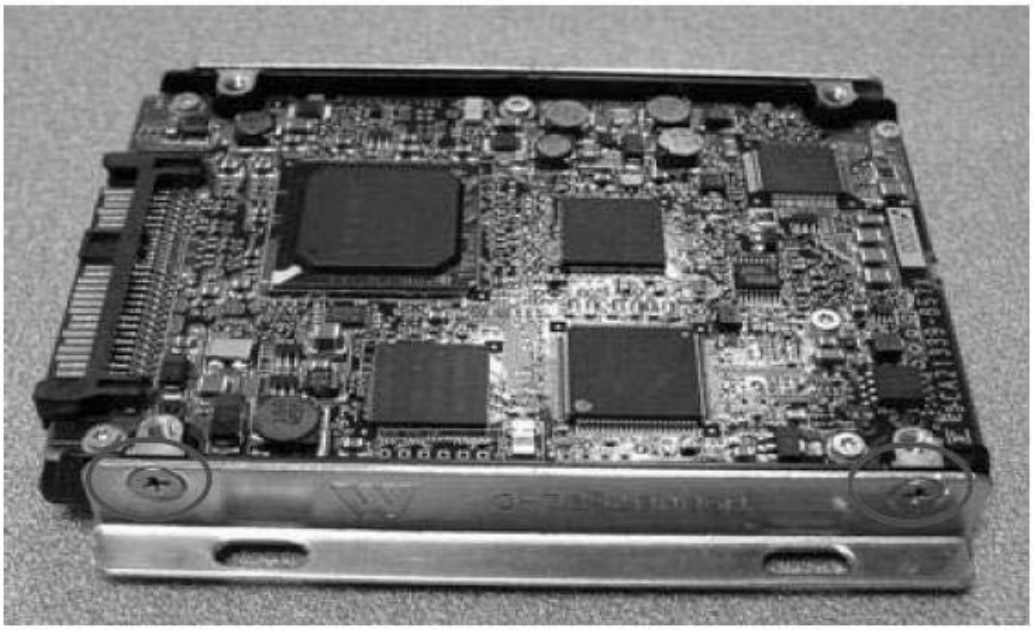
Step 5. Grasp the HDD body with one hand, holding it at the mounting brackets. Gently pull the HDD body away from the blade SAS connector (in the opposite direction of the arrows in Figure 1-21) to disconnect the HDD.

Figure 1-21Hard Disk Drive (Arrows Point Toward the Blade Connector)

Step 6. When disconnected from the blade SAS connector, lift the HDD body with mounting brackets free of the HP bc2100 ATCA Server Blade circuit board.

Step 7. Lay the HDD body with mounting brackets flat on an ESD-safe working surface with the circuit-side facing upward (see Figure 1-22).

Figure 1-22Hard Disk Drive, Mounting Brackets Attached



Step 8. Remove the four counter-sunk mounting bracket screws in the side of the HDD body. There are two screws on each side (circled in red in Figure 1-22).

Step 9. Set the mounting bracket screws and the brackets aside for reuse, and place the HDD body into an anti-static bag.

Replacing the Hard Disk Drive and Mounting Brackets

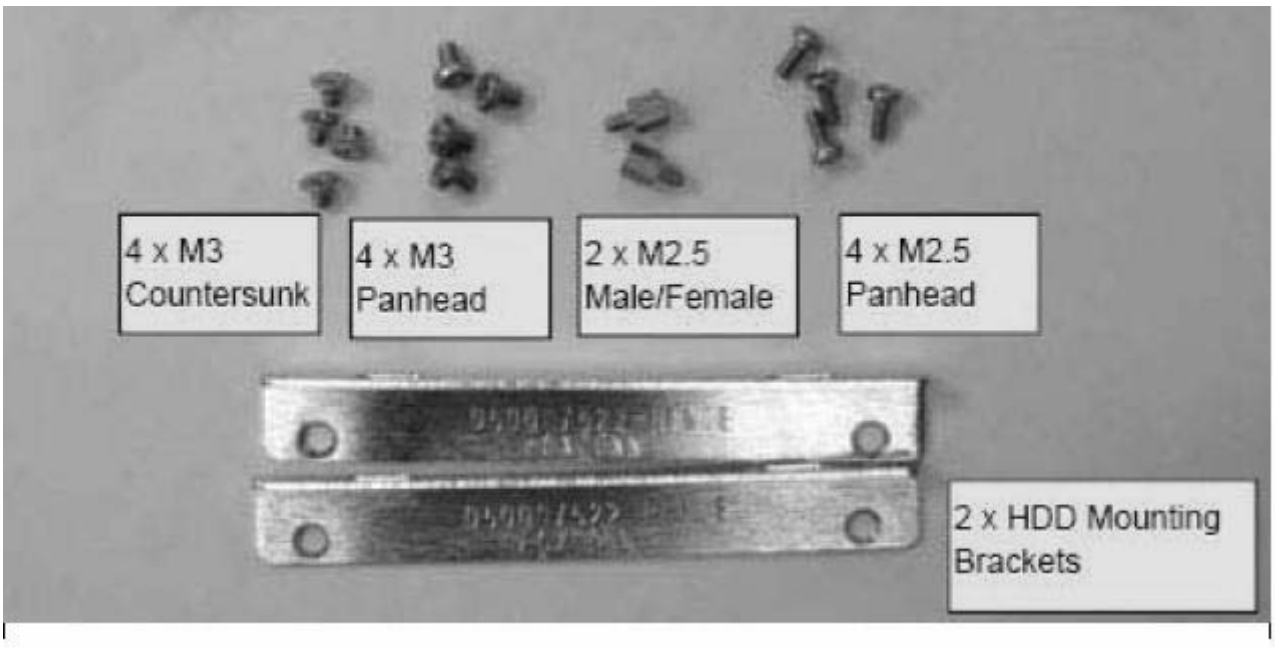
CAUTION Electrostatic Discharge Hazard. Observe all ESD safety precautions while completing this procedure. Failure to follow ESD safety precautions could result in damage to the 14-Slot Shelf and equipment.

To replace the HDD and HDD mounting brackets, complete the following steps:

Step 1. Place the HDD body on a flat anti-static working surface, with the HDD circuit-side facing up (as shown in Figure 1-22).

Step 2. Using the four countersunk screws removed earlier and the two HDD mounting brackets (see Figure 1-23), attach the mounting brackets to the HDD body (see Figure 1-22).

Figure 1-23 Hard Disk Drive Mounting Bracket Kit



Step 3. Holding the HDD and the mounting bracket assembly with the circuit-side down, slide the HDD body assembly in the direction of the arrows in order to mate the HDD body connector with the blade SAS connector on the HP bc2100 ATCA Server Blade (Figure 1-21).

Step 4. Ensure that the HDD assembly connector is fully mated to the Server Blade on-board connector, and that the HDD mounting bracket holes align with the four HDD mounting studs on the blade.

Step 5. Insert the four panhead HDD mounting bracket screws (removed earlier) into the HDD mounting bracket holes and mounting posts under the brackets in order to affix the HDD assembly to the blade (Figure 1-20). Tighten the screws to 67.7 newton cm (6 in-lbs).

Step 6. Insert the four countersunk blade cover panel retaining screws previously removed, and tighten them.

Step 7. This completes replacement of the Server Blade Hard Disk Drive. The blade is now ready for re-installation.

HP bc2100 ATCA Server Blade Memory Modules

The HP bc2100 ATCA Server Blade Dual In-line Memory Modules (DIMMs) are always installed in pairs. Each individual DIMM within a pair must be identical in storage capacity, revision, and part number to the other DIMM in the pair. The current DIMM configurations supported by Hewlett-Packard include any of the following:

- Two 1-GB DIMMs (2 GB)
- Four 1-GB DIMMs (4 GB)
- Two 2-GB DIMMs (4 GB)
- Four 2-GB DIMMs (8 GB)

This section provides information on removing and replacing the DIMMs in the HP bc2100 ATCA Server Blade.

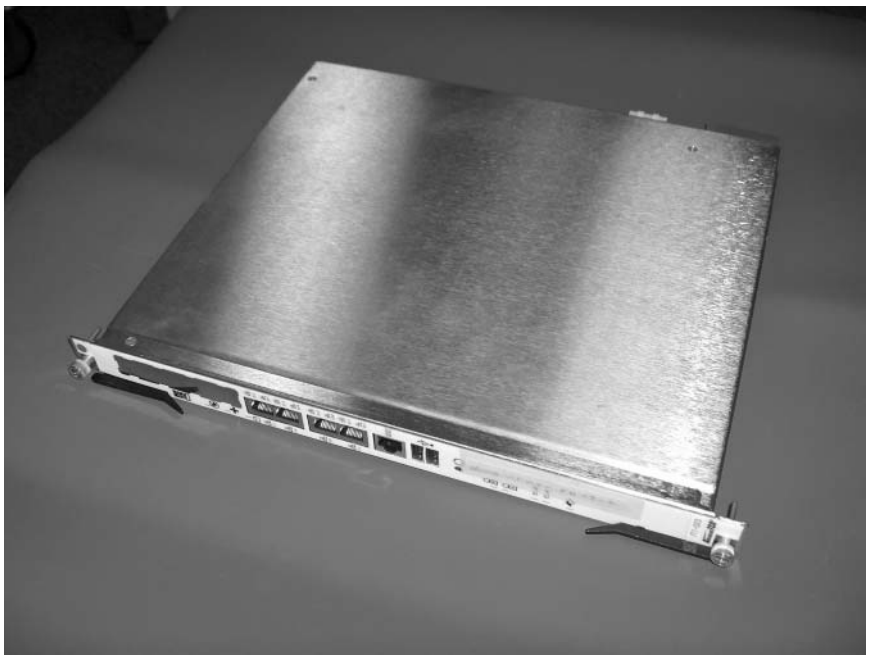
Removing the DIMMs

To remove mounted DIMMs from the Server Blade, complete the following steps:

CAUTION Observe all ESD safety precautions while completing this procedure. Failure to follow ESD safety precautions could result in damage to the 14-Slot Shelf and equipment.

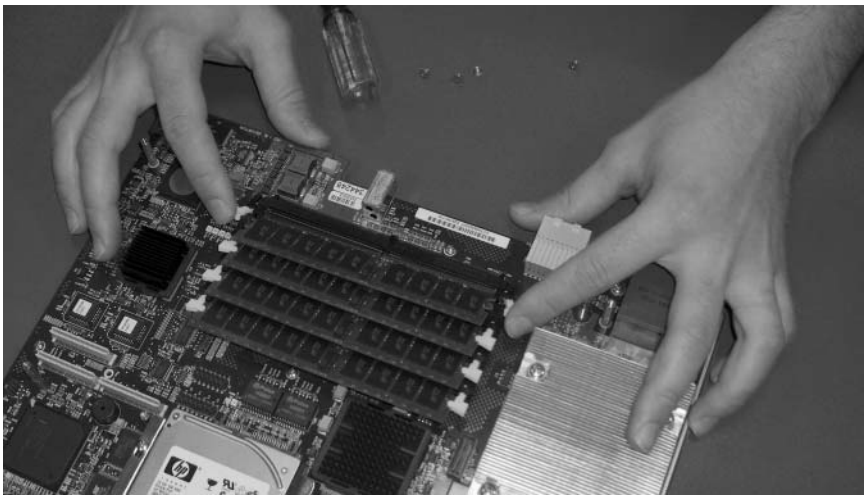
1. Following hot-swap procedures, remove the HP bc2100 ATCA Server Blade from the 14-Slot Shelf.
2. Lay the Server Blade flat on an anti-static working surface and position the blade's front panel facing you. Ensure that the blade backplane connector (blue color) is facing away from you, and is on right side of the blade as it lays flat (Figure 1-24).

Figure 1-24 HP bc2100 ATCA Server Blade, Access Cover Panel Installed



3. Remove the countersunk retaining screws that secure the blade access cover panel and remove the cover panel. Set the cover panel and the retaining screws aside for reuse.
4. To release a DIMM from its socket, pull the two locking levers outward and away from the DIMM ends (see Figure 1-25).

Figure 1-25 Unlocking DIMM in DIMM Socket U5



5. Remove the DIMM by angling it away from the socket and gently pulling on it. Place the DIMM in an static-safe location.
6. Repeat steps 4 and 5 to remove additional DIMMs. Place each memory module in a static-safe location.

Replacing the Memory Modules

CAUTION Observe all ESD safety precautions while completing this procedure. Failure to follow ESD safety precautions could result in damage to the 14-Slot Shelf and equipment.

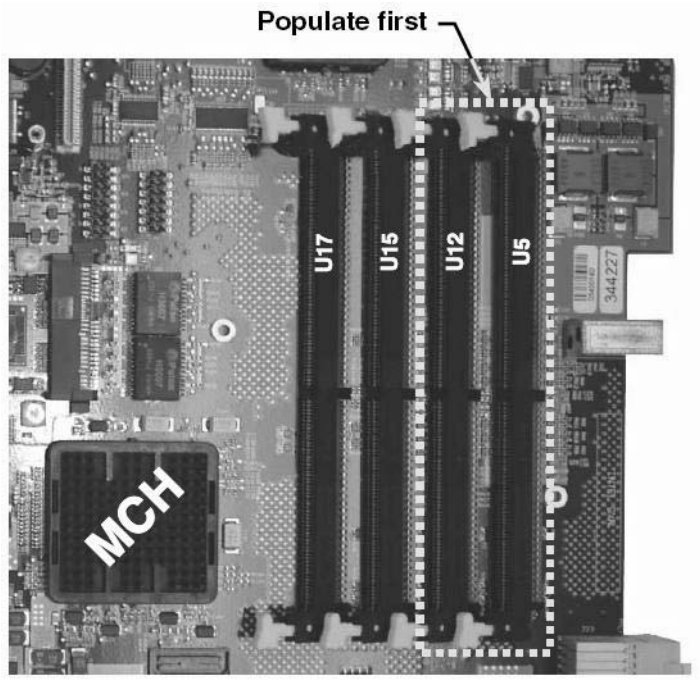
CAUTION Each DIMM is keyed. Ensure the memory module key is indexed correctly before seating into a DIMM socket. Failure to properly align the DIMM will damage the DIMM and the socket requiring replacement of the Server Blade and the affected DIMM.

CAUTION The DIMMs must be replaced in pairs. Each individual DIMM must be identical in storage capacity, revision, and part number for each pair. The only DIMM configurations supported by HP include any of the following:

- Two 1-GB DIMMs (2 GB)
- Four 1-GB DIMMs (4 GB)
- Two 2-GB DIMMs (4 GB)
- Four 2-GB DIMMs (8 GB)

IMPORTANT DIMM sockets U5 and U12 must always be populated (Figure 1-26).

Figure 1-26 DIMM Socket Assignments



If you are only loading one DIMM pair, load the first DIMM into socket U12. This will ease the installation of the second DIMM into socket U5.

If you are populating all four DIMM sockets, load the DIMMs in this order: Socket U17, U15, U12, and then U5.

1. Angle the selected DIMM over the empty socket.
2. Correctly orient the key and press the DIMM down evenly into the socket to seat the DIMM.
3. The DIMM socket levers will rise to secure the DIMM. Pull each lever against the side of the DIMM to ensure it is properly seated.
4. Repeat steps 1 through 3 to load the remaining DIMMs.
5. Reinstall the Server Blade access cover. Fasten the cover with the screws retained earlier.
6. Reinstall the Server Blade into the chassis.

This completes the DIMM replacement procedure.

2 LED Indicators

Introduction

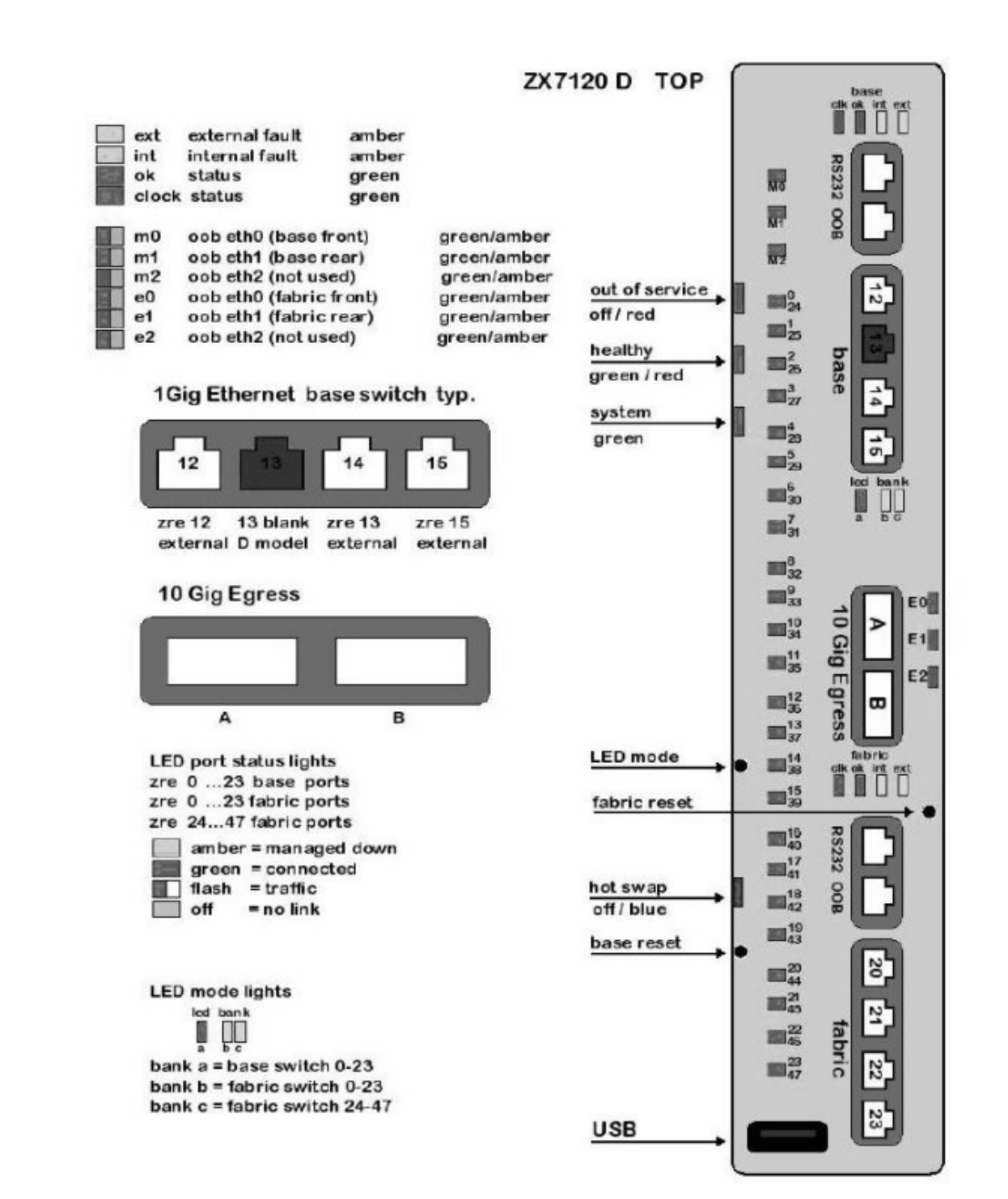
Many of the components of the HP bh5700 have Light Emitting Diodes (LEDs) that are a visual diagnostic for the health of the server. The usual colors used for LEDs are amber (yellow), green, red, and blue. Each component has a variety of LEDs that have different server health meanings. Listed are the LEDs for the Ethernet Switch Blade, the 14-slot Shelf Manager (ShMM), and the HP bc2100 ATCA Server Blade.

Ethernet Switch Blade

The following information covers normal and abnormal LED activity.

Normal LED Activity

Figure 2-1 Ethernet Switch blade LED Display



During a successful boot, the following sequence of LED activity should be observed:

1. All LEDs are off as the board is released from reset (Initial insertion into chassis, or pressing the front panel reset button).
2. IPMC turns on the OUT OF SERVICE and HEALTHY LEDs on the front panel.
3. HEALTHY LED turns green when the IPMC is up and running.
4. Ethernet link and activity (CLK, OK, INT FLT, EXT FLT) LEDs are turned on when the IPMC powers up the board (these LEDs are also turned on when the front panel reset switch is depressed, but turned off again when the board is released from reset in step 1).
5. When power up is complete, the Ethernet link/activity LEDs off.
6. When the bootloader code begins executing out of SDRAM, the Ethernet link LEDs turn to ORANGE and CLK turns to RED. OK, INT FLT, and EXT FLT remain off. The LEDs will remain in this state while the OpenArchitect (OA) software is loaded into RAM. (Console: Sparky version message is displayed, "Testing memory activity," ZMON banner displayed).
7. OK is turned on when the OA software completes its boot successfully. The CLK LED will blink. INT FLT should be off. The Ethernet link LEDs will reflect the actual state of the network link for the configured ports. The EXT FLT link may be turned on if any port brought up by *ifconfig* cannot establish a link to a remote partner.

NOTE If the switch ports are not fully populated with connections to other devices, and the `ifconfig` brought up all the parts, this can result in the EXT FLT being turned on even though all of the established connections are operating normally.

---

8. Normal LED states for a fully operational (healthy state) switch are as follows:
   - Healthy LED – Green
   - Hot-Swap LED - off
   - CLK LED blinking
   - OK LED on

Deviations from this sequence can help pinpoint at what point during the boot process the switch encountered a problem.

NOTE If the Ethernet Switch Blade does not display this normal sequence of activity, refer to the Abnormal LED Activity section, below.

Abnormal LED Activity

Use the table below as a guide to troubleshoot the LED indicators after the Ethernet Switch Blade has been powered up in the chassis for at least 60 seconds and allowed to go through the normal boot process. Table 2-1 translates the LED indicators on the front panel of the Ethernet Switch Blade into a Tip number. Use the tip number listed in Table 2-1 to find a solution in Table 2-2.

Table 2-1 Troubleshooting the Ethernet Switch Blade with Status Indicators

Troubleshooting with LED Status Indicators								
Hot-Swap (Blue_	**Healthy (Red / Green)**	**CLK (Green)**	**OK (Green)**	**Int Fault (Amber)**	**System (Green)**	**Out of Service (Red)**	**Ext Fault (Amber)**	**Tip**
Off	Green	Blinking Green	Green	Off	Off	Off	-	Normal
Off	Off	Off	Off	Off	Off	Off	Off	1
Blue or blinking blue	**RED**	Off	Off	Off	**..**	**..**	Off	**2**
Off	**Red**	Off	Off	Off	**..**	**..**	Off	**3**
Off	**Green**	Off	Off	Off	**..**	**..**	Off	**4**
Off	Off	**Red**	Off	Off	**..**	**..**	Off	**5**
..	**..**	**..**	**..**	**Amber**	Off	**OFF**	Off	**6**
..	**..**	**..**	**..**	**..**	**..**	**Red**	**..**	**7**
..	**..**	**..**	**..**	**..**	**..**	**..**	**Amber**	**8**

Table 2-2 Solution Table for LED Indicators

Tip	Problem	Solution
1	No power	1. Examine other blades in the front card cage. If all blades indicate no power, verify that the power is applied to the chassis and that the Power Entry Modules are operational. 2. Verify that the Switch is fully inserted into the front card cage. If not, fully seat the switch. 3. Verify that the switch is in either chassis slot 7 or 8. If in another slot, move it to either slot 7 or 8. 4. Check to see if the lower ejector lever is open. If open or partially open, fully close the lower ejector lever. 5. Remove the switch and examine the blade's backplane connectors, especially the blue power connector, for bent or broken pins. If any pins are bent or broken are, replace the switch. 6. Examine the backplane's blade connectors for bent or broken pins. If any pins are bent or broken, replace the chassis.
2	Hot-Swap ejector open	1. Make sure that the lower ejector handle is fully closed. The hot swap LED may remain illuminated or blinking if awaiting permission to activate from the Shelf Manager. 2. If either ejector handle cannot be closed, replace the Switch. 3. If the lower Hot Swap handle is closed, retrieve the Mstate information from the Shelf Manager. 4. A blinking Hot Swap LED may indicate a failure in communications between the switch and the Shelf Manager. Use information in the System Event Log (SEL) to identify chassis communication problems. If other FRUs are also encountering difficulty, replace the Chassis.

Table 2-2 Solution Table for LED Indicators (Continued)

Tip	Problem	Solution
3	Voltage or temperature sensors are outside of threshold	1. Examine the other Blades in the Shelf. If all of the healthy LEDs are illuminated red, there may be a power failure on one of the two redundant power busses. Check that both power busses to the ATCA are on (energized) and check both Power Entry Modules as described in the PEM section. 2. If voltage and temperature sensors are within threshold, this indicates an internal hardware fault and inoperable IPMC. Additional troubleshooting using the SEL is required to determine the cause of failure. 3. Follow the other troubleshooting tips in 3.5to determine if exceeded thresholds are specific to the switch 4. If a chassis problem is suspected, replace the chassis 5. If the switch is the only FRU experiencing the problem reset the switch by pressing the base reset button. 6. If the reset does not correct the problem, replace the Switch.
4	Bootloader code unable to load	1. Reset the switch by pressing the base reset button. 2. If the reset does not solve the problem, the boot loader code was not able to load.
5	The OpenArchitect Linux image did not load successfully from an onboard flash.	1. The OpenArchitect Linux image did not load successfully from the onboard flash. If a recent firmware update was performed on the switch, this may indicate either a flash failure, or a corrupted image was flashed during the update. • Using a console connection configure the switch to boot from its alternate flash. See Troubleshooting a failed OpenArchitect Load" in the Ethernet Switch Blade Manual for additional information. • If the e OpenArchitect Linux image fails to load after being directed to boot from the alternate flash and troubleshooting fails to correct the problem, replace the Switch.
6	Serious Internal Hardware error	1. Reset the switch with the base reset button. 2. If the reset does not correct the problem, replace the switch.

Table 2-2 Solution Table for LED Indicators (Continued)

Tip	Problem	Solution
7	Board held in reset	1. The Shelf Manager is holding the Switch in RESET. Follow the troubleshooting tips in "Diagnosing a failed Shelf Manger Activation" in the Ethernet Switch Blade Manual to extract the Shelf Manager information for further analysis. 2. If, after troubleshooting the Shelf Manager information the Switch is still being held in RESET, replace the Switch.
8	Network Error	1. The EXT FLT LED indicates communications could not be established with one or more remote partner devices on an active port or ports. Ports which were configured to be up (via ifconfig), but do not have remote partner devices attached, can cause the EXT FLT LED to be lit, even if there are no hardware problems with the Switch. See "Network Configuration Problems" in the Ethernet Switch Blade Manual for more information. 2. Examine the cable between the Switch and the remote partners. If the cable is disconnected, broken, or damaged, replace the cable. 3. Verify that the remote partners are active. If not, activate the remote partner and verify proper operation. 4. If the remote partners are active and the cable is good, reset the switch by pressing the fabric reset button. 5. If the fabric reset button does not correct the problem, replace the Switch.

14-Slot Shelf

This section provides LED indicator and LED connection information on the HP bh5700 Telco Blade 14-Slot Shelf and its components.

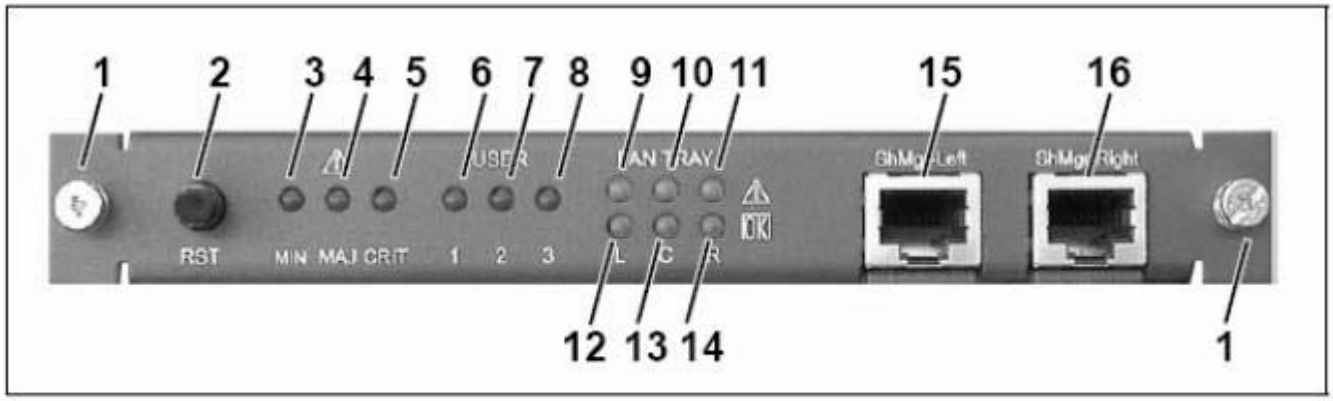
Shelf Alarm display

The Alarm Display Panel (ADP) is located at the right front top side of the Shelf. It provides the Telco Alarm connector (DB15-male). The I²C-bus devices on the ADP are connected to the Master-Only I²C-bus of both Shelf Managers. Only the active Shelf Manager has access to the SAP.

The ADP is a user interface and is located at the left front top of the Shelf. It provides the following (see Figure 2-2):

- Three Shelf Alarm LEDs (MINOR, MAJOR, CRITICAL)
- Three User-definable LEDs (USER1, USER2, USER3)
- Three Fan Tray Alarm LEDs (Left, Center, Right)
- Three Fan Tray OK LEDs (Left, Center, Right)
- An Alarm Cutoff push button (RST)
- Two serial console interfaces for both Shelf Managers (RJ45 connectors)

Figure 2-2 Alarm Display Panel



1	Fixing screw	9	LED Fan Tray Left Alarm (red)
2	Alarm Cutoff push button (RST)	10	LED Fan Tray Center Alarm (red)
3	LED Min. Alarm (yellow)	11	LED Fan Tray Right Alarm (red)
4	LED Maj. Alarm (amber)	12	LED Fan Tray Left OK (green)
5	LED Crit. Alarm (red)	13	LED Fan Tray Center OK (green)
6	User definable LED 1 (red)	14	LED Fan Tray Right OK (green)
7	User definable LED 2 (green)	15	Serial Console Interface primary Shelf Manager (Left)
8	User definable LED 3 (amber)	16	Serial Console Interface secondary Shelf Manager (Right)

The LEDs USER (1, 2, 3) are user definable and connected to the I²C-bus I/O port of the PCA 9555 on the ADP.

Troubleshooting the Shelf Alarm Display Panel

The Shelf Alarm Display Panel has a low failure rate. Any indication displayed is being reported by some other electrical subsystem

Table 2-3 Shelf Alarm Display Panel LED Indicators

Critical Alarm (Red)	Major Alarm (Amber)	Minor Alarm (Yellow)	Fan Tray Alarm (Red)	Fan Tray OK (Green)	User LED 1 (Red)	User LED 2 (Green)	User LED 3 (Amber)	Tip
Off	Off	Off	Off	Green	Off	Off	Off	Normal
Red	Amber	Yellow	Red	Green	Red	Green	Amber	1

Table 2-3 Shelf Alarm Display Panel LED Indicators (Continued)

Critical Alarm (Red)	Major Alarm (Amber)	Minor Alarm (Yellow)	Fan Tray Alarm (Red)	Fan Tray OK (Green)	User LED 1 (Red)	User LED 2 (Green)	User LED 3 (Amber)	Tip
Off	Off	Off	Off	Off	Off	Off	Off	2
Red	-	-	-	-	-	-	-	3
-	Amber	-	-	-	-	-	-	4
-	-	Yellow	-	-	-	-	-	5
-	-	-	Red	-	-	-	-	6
-	-	-	-	-	Red	-	-	7
-	-	-	-	-	-	Green	-	8
-	-	-	-	-	-	-	Amber	9

Table 2-4 Shelf Alarm Display Panel LED Tips

Tip	Symptom	Action
1	LED Test	1. The LEDs are tested when primary power is first applied to the chassis by illuminating all LEDs for a period of up to 15 seconds. 2. If one or more LEDs fail to illuminate, follow the instructions in Tip 2.

Table 2-4 Shelf Alarm Display Panel LED Tips (Continued)

Tip	Symptom	Action
2	All LEDs are off	1. Check the Power Entry Module for proper operation. 2. Check the Shelf Alarm Display for proper seating. 3. Cycle both primary power busses to the system at the same time. During the initial boot cycle all 12 LEDs should turn on during the LED check cycle. If all LEDs turn on the Shelf Alarm Display is good. Look for other error conditions and LEDs 4. Remove the Shelf Alarm Display and examine the Shelf Alarm Panel's Horizontal Board connector for bent or broken pins. If any pin is bent or damaged, replace the Shelf Alarm Display Assembly. 5. Examine the Shelf Alarm Panel mating connector on the Horizontal Board for bent or broken pins. If any pin is bent or damaged, replace the Chassis. 6. Examine the Riser Board to determine if a payload module in slot 14 has scraped against it. If the Riser Board is damaged replace the chassis. 7. Replace the Shelf Alarm Display.
3	Critical Event has occurred	The Shelf Alarm Display is indicating that a Critical event has occurred. See the System Event Log, 0, for Critical Events to determine which parameter caused the alarm.
4	Major Event has occurred	The Shelf Alarm Display is indicating that a Major event has occurred. See the System Event Log, 0, for Major Events to determine which parameter caused the alarm.
5	Minor Event has occurred	The Shelf Alarm Display is indicating that a Minor event has occurred. See the System Event Log, 0, for Minor Events to determine which parameter caused the alarm.
6	Fan Tray Failure	The Shelf Alarm Display is indicating that there is a failure in one of the Fan Trays. Check the fan trays.
7	User LED 1 Indication	The user LEDs are delivered unprogrammed. They may be programmed to indicate events that are important to the customer. If a user defined LED is lit, report it to the customer to determine the cause.
8	User LED 2 Indication	The user LEDs are delivered unprogrammed. They may be programmed to indicate events that are important to the customer. If a user defined LED is lit, report it to the customer to determine the cause.
9	User LED 3 Indication	The user LEDs are delivered unprogrammed. They may be programmed to indicate events that are important to the customer. If a user defined LED is lit, report it to the customer to determine the cause.

Connection Between the Shelf Manager and ADP

The following figures show the connection between the Shelf Manager and the ADP, and block diagrams of the Shelf Manager and the ADP (Figure 2-3, Figure 2-4, and, Figure 2-5).

Figure 2-3 Alarm Display Panel Interconnect Diagram

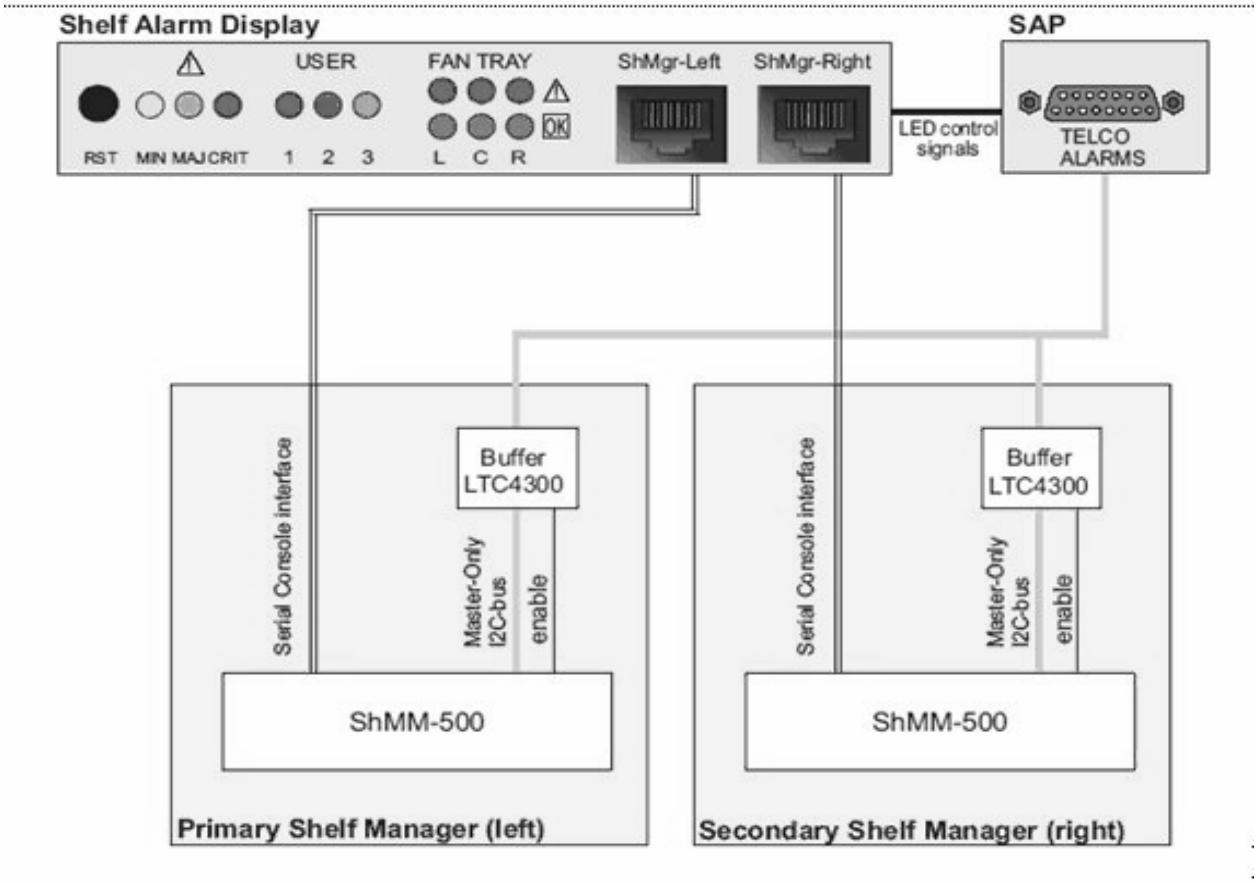


Figure 2-4 Alarm Display Panel Block Diagram (1)

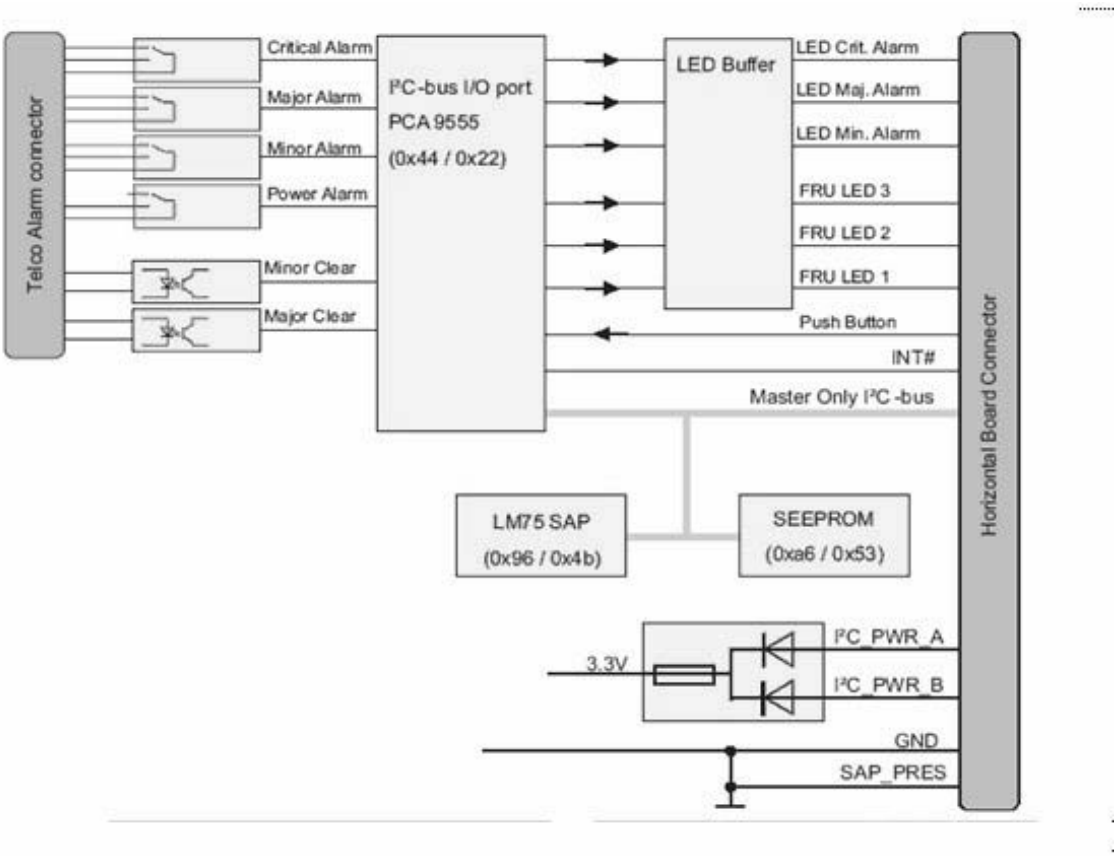
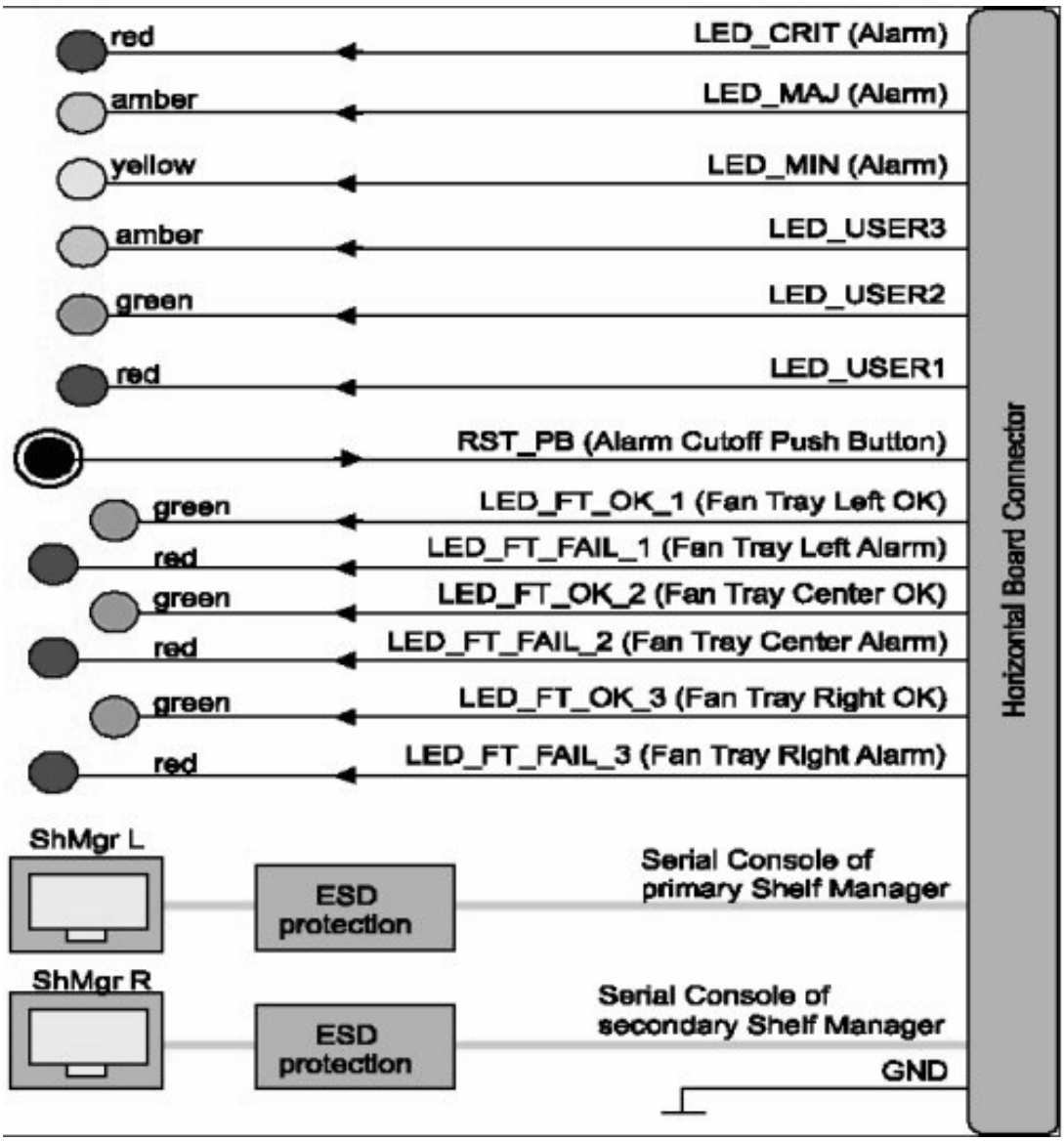


Figure 2-5 Alarm Display Panel Block Diagram (2)



Shelf Alarm Display Horizontal Board Connector

Figure 2-6 shows the connector for the Shelf Alarm Display. Table 2-5 lists the pin assignments for the SAD.

Figure 2-6 Alarm Display Panel Horizontal Board Connector

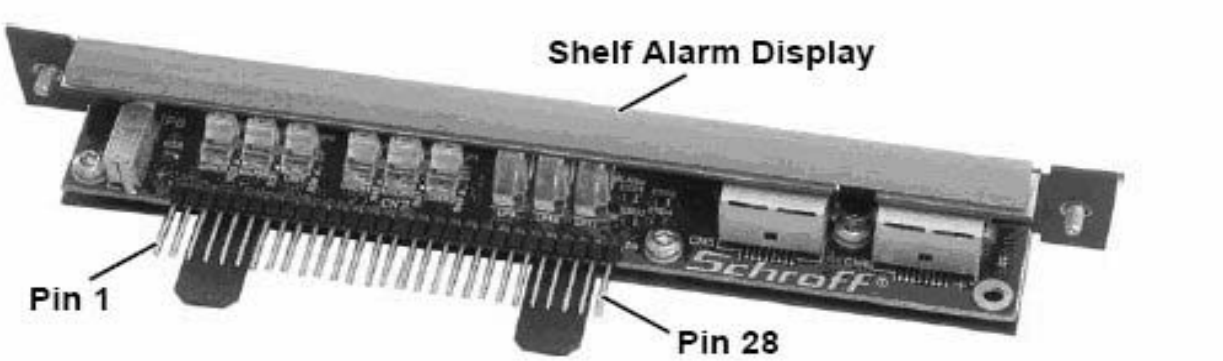


Table 2-5 Alarm Display Panel Horizontal Board Pin Assignment

Pin	Signal Name	Description
1	GND	Ground
2	GND	Ground
3	GND	Ground
4	RXD0_ACB1	Receive Data to primary Shelf Manager
5	RXD0_ACB2	Receive Data to secondary Manager
6	TXD0_ACB1	Transmit Data from primary Shelf Manager
7	TXD0_ACB2	Transmit Data from secondary Shelf Manager
8	DSR_ACB1	Data Set Ready to primary Shelf Manager
9	DSR_ACB2	Data Set Ready to secondary Shelf Manager
10	DTR_ACB1	Data Terminal Ready from primary Shelf Manager
11	DTR_ACB2	Data Terminal Ready from secondary Shelf Manager
12	RXD0_ACB1	Clear To Send from primary Shelf Manager
13	CTS_ACB2	Clear to Send from secondary Shelf Manager
14	RTS_ACB1	Request to Send to primary Shelf Manager
15	RTS_ACB2	Request to Send to secondary Shelf Manager
16	LED_MIN	Signal to Minor Alarm LED
17	LED_MAJ	Signal to Major Alarm LED
18	LED_CRIT	Signal to Critical Alarm LED
19	LED_USER1	Signal to User Definable LED1
20	LED_USER2	Signal to User Definable LED2
21	LED_USER3	Signal to User Definable LED3

Table 2-5 Alarm Display Panel Horizontal Board Pin Assignment (Continued)

Pin	Signal Name	Description
22	RST_PB	Signal from Alarm Cutoff Push Button
23	LED_FT-FAIL_1	Signal to Fan Tray Left Alarm LED
24	LED_FT_FAIL_2	Signal to Fan Tray Center Alarm LED
25	LED_FT_FAIL_3	Signal to Fan Tray Right Alarm LED
26	LED_FT_OK_1	Signal to Fan Tray Left OK LED
27	LED_FT_OK_2	Signal to Fan Tray Center OK LED
28	LED_FT_OK_3	Signal to Fan Tray Left OK LED

Alarm Display Panel Telco Alarms

The following section describes some of the alarm interfaces, LEDs, and other functions.

Telco Alarm Interface

The ADP provides a Telco Alarm interface on the DB15-male connector. The Telco Alarm interface relay circuits are capable of carrying 60 VDC or 1 A with a max. rating of 30 VA. The ADP accepts timed pulse inputs for clearing Minor and Major alarm states.

NOTE There is no test for the Critical state.

Reset is accomplished by asserting a voltage differential from 3.3 V to 48 V for between 200 and 300 ms. The acceptance voltage range is from 0 to 48 VDC continuous (handles up to 60 VDC at a 50% duty cycle). The current drawn by a reset input does not exceed 12 mA.

Telco Alarm LEDs

The Shelf Alarm Display provides the Telco Alarm LEDs. These LEDs indicate presence of Critical, Major and Minor alarms as follows:

Table 2-6 Telco Alarm LEDs

State	Description
Off	No alarm triggered
On	Alarm triggered
Blinking	Alarm Cutoff (ACO) is activated

Telco Alarm Cutoff Pushbuttons

The Telco Alarm Cutoff push button (RST) on the Shelf Alarm Display activates the Alarm Cutoff (ACO) state. When ACO is activated, the active Alarm LEDs blink and all of the alarm relays are deactivated.

NOTE The push button only activates the Alarm Cutoff (ACO) state, but does not clear the alarm completely.

Telco Alarm Connector on the Shelf Alarm Panel

The Shelf Alarm Panel (SAP) is a user interface that provides a Telco Alarm connector for troubleshooting.

Figure 2-7 Telco Alarm Connector (DB15-male)

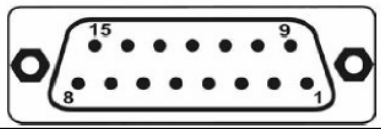


Table 2-7 Telco Alarm Connector (DB15-male)

cn2	Name	Description
1	AMIR+	MinorReset+
2	AMIR-	MinorRest-
3	AMAR+	MajorReset+
4	AMAR-	MajorReset-
5	ACNO	CriticalAlarm-NO
6	ACNC	CriticalAlarm-NC
7	ACCOM	CriticalAlarm-COM
8	AMINO	MinorAlarm-NO
9	AMINC	MinorAlarm-NC
10	AMINCOM	MinorAlarm-CDM
11	AMANO	MajorAlarm-NO
12	AMANC	MajorAlarm-NC
13	AMACOM	MajorAlarm-COM
14	APRCO	PwrAlarm-NO
15	APRCOM	PwrAlarm-COM

Troubleshooting the Shelf Alarm Panel

The Shelf Alarm Panel is a pass-through device with no logical circuits. Problems with the SAP are generally mechanical damage to the Telco Alarm Connector or the connector between the Shelf Alarm Panel and the Horizontal Board.

Table 2-8 Shelf Alarm Panel Troubleshooting

Tip	Symptom	Action
1	Communication problems to the Shelf thorough the SAP connector	1. Check Shelf Alarm Panel for proper seating and verify that the fixing screws are tight. 2. Examine the Telco Alarm Connector for bent or broken pins. If pins are bent or damaged, replace the Shelf Alarm Panel Assembly. 3. Remove the Shelf Alarm Panel and examine the Shelf Alarm Display's Horizontal Board connector for bent or broken pins. If bent or damaged pins are discovered, replace the Shelf Alarm Panel Assembly. 4. Examine the Shelf Alarm Panel mating connector on the Horizontal Board for bent or broken pins. If pins are bent or damaged, replace the Chassis. 5. Replace the Shelf Alarm Panel.

Alarm Connector Panel Horizontal Board Connector

Figure 2-8 and Table 2-9 show the Alarm Connector Panel (ACP) Horizontal Board Connector and the pin assignments.

Figure 2-8 Alarm Connector Panel Horizontal Board Connector

Table 2-9 Alarm Connector Panel Horizontal Board Connector Pin Assignment

Pin	Signal Name	Description
1	LED_USER1	Signal to User Definable LED1 on Shelf Alarm Display
2	LED_USER2	Signal to User Definable LED2 on Shelf Alarm Display

Table 2-9 Alarm Connector Panel Horizontal Board Connector Pin Assignment

Pin	Signal Name	Description
3	LED_USER3	Signal to User definable LED3 on Shelf Alarm Display
4	LED_MIN	Signal to Minor Alarm LED on Shelf Alarm Display
5	LED_MAJ	Signal to Major Alarm LED on Shelf Alarm Display
6	LED_CRIT	Signal to Critical Alarm LED on Shelf Alarm Display
7	RST_PB	Signal from Alarm Cutoff Push Button on Shelf Alarm Display
8	GND	Ground
9	SCL_CH0	Serial Clock Master – Only I²C-Bus Channel 0
10	SDA_CH0	Serial Data master – Only I²C–Bus Channel 0
11	GND	Ground
12	ADP_PRES	ADP Presence Signal (Grounded on DAP)
13	INT#	External Interrupt Request (Master – Only I²C–bus devices
14	GND	Ground
15	I^2C_PWR_B	3.3 VDC power supply for Shelf I²C–bus devices
16	I^2C_PWR_A	3.3 VDC power supply for Shelf I²C-bus devices

Alarm Display Panel Temperature Sensor

The LM75 temperature sensor measuring the board temperature is located on the ADP PCB. The temperature sensor is connected to the Master-Only I²C-bus.

Fan Trays

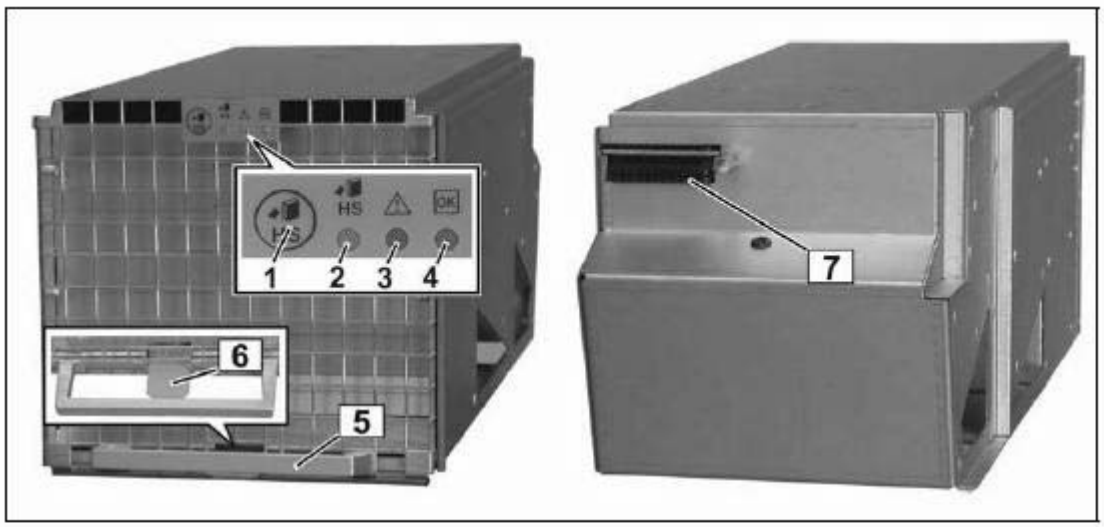
The 14 Slot ATCA Shelf contains three interchangeable Fan Trays. The Fan Trays are plugged in at the rear top of the Shelf and can be removed by lifting the retention lever.

Each Fan Tray contains three radial fans for cooling the front boards. The fan speeds are monitored by a tachometer signal sent from the Fan Trays to the Shelf Manager. The Shelf Manager regulates the fan speed with a DC voltage. The display module at the Fan Tray provides:

- A blue Hot-Swap LED.
- A red Fan Tray Alarm LED.
- A green Fan Tray OK LED.
- A Hot-Swap push button.

The Fan Tray, its display module, and the fan tray numbering scheme are shown in Figure 2-9, Figure 2-10, and Table 2-10.

Figure 2-9 Fan Tray, Front and Rear View



1	Hot Swap push button	5	Extraction handle
2	Hot Swap LED (blue)	6	Retention lever
3	Fan Tray Alarm LED (red)	7	Horizontal Board connector
4	Fan Tray OK LED (green)		

Figure 2-10 Fan Tray Number Scheme

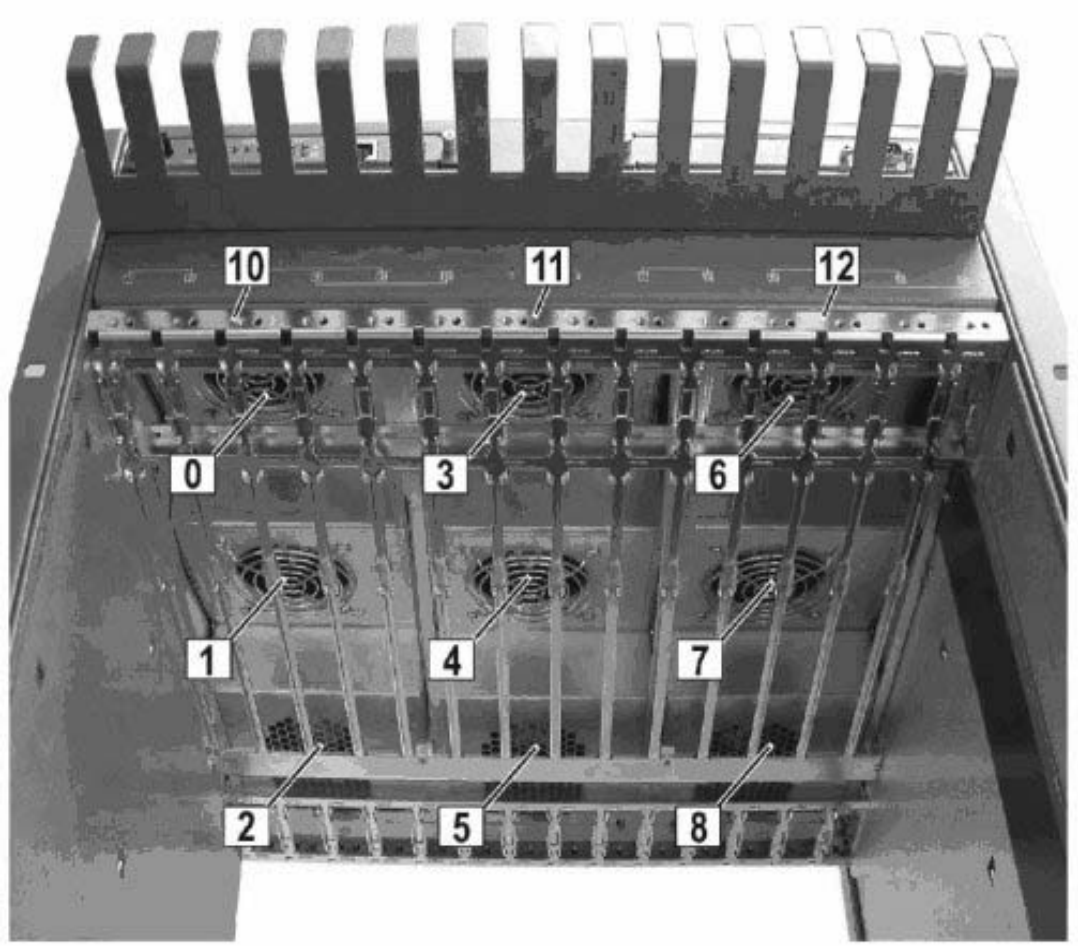


Table 2-10 Fan and Fan Tray Numbering Scheme

0	Fan #0	4	Fan #4	8	Fan #8
1	Fan #1	5	Fan #5	10	Fan Tray #0 (Left)
2	Fan #2	6	Fan #6	11	Fan Tray #1 (Center)
3	Fan #3	7	Fan #7	12	Fan Tray #2 (Right)

Fan Tray Signals

The Fan Tray provides signals for:

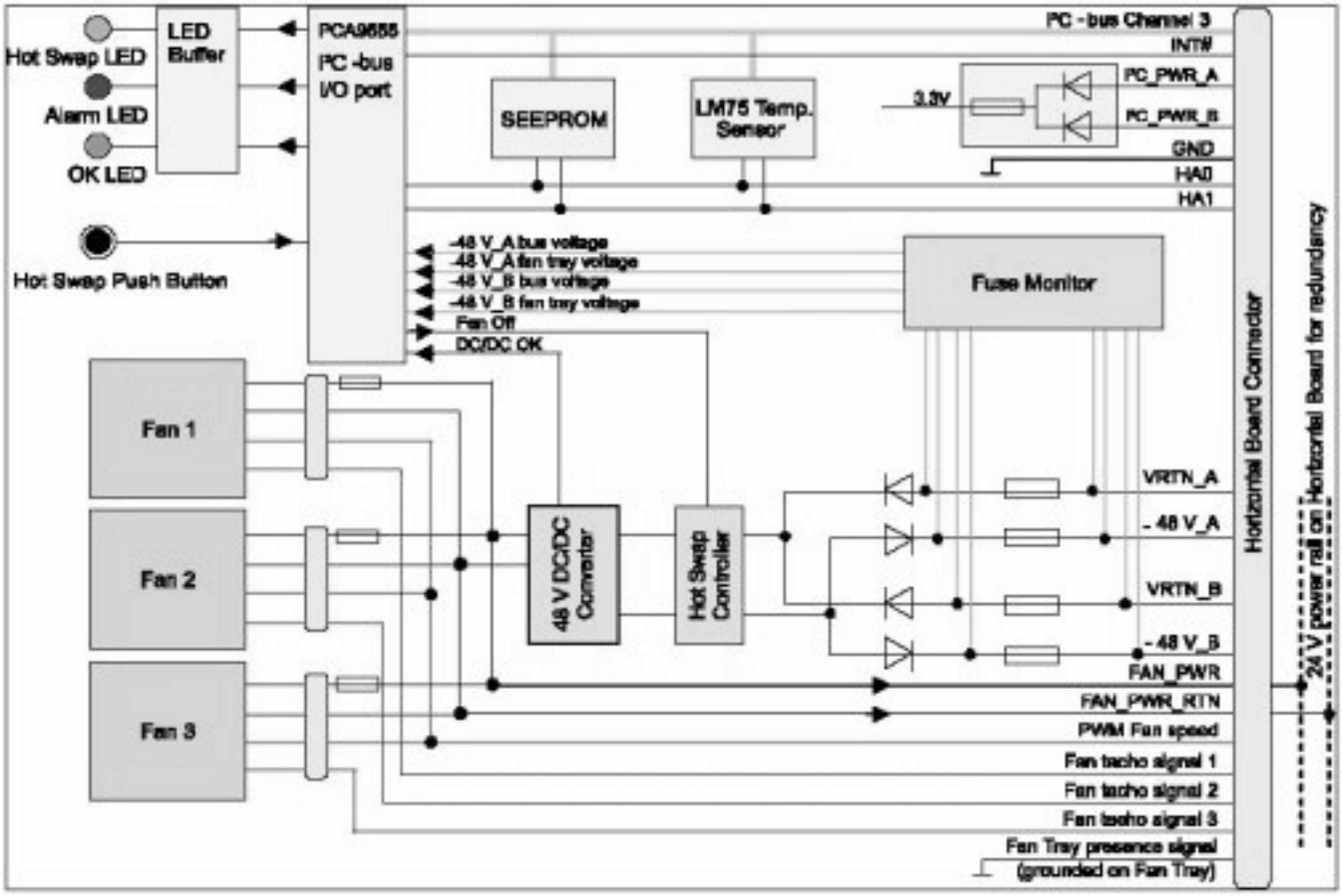
- Voltage monitoring
- Switching off the fans
- Status of the DC/DC converter

These signals are controlled by the PCA9555 I²C device on the Fan Tray PCB. The Shelf Manager has access to these signals via Channel 3 of the Master-Only I²C-bus. The fan signals are shown in Table 2-11, and Figure 2-11.

Table 2-11 Fan Tray Signals

Signal	Description
-48 V_A bus voltage	Indicates the presence of the -48 V_A/VRTN_A at the Horizontal Board Connector.
-48 V_A fan tray voltage	Indicates the presence of the -48 V_A/VRTN_A after the fan tray's main fuse.
-48 V_B bus voltage	Indicates the presence of the -48 V_B/VRTN_B at the Horizontal Board Connector.
-48 V_B fan tray voltage	Indicates the presence of the -48 V_B/VRTN_B after the fan tray's main fuse.
DC/DC OK	Indicates the proper functioning of the DC-DC converter that generates the 24 V voltage supply.
Fan Off	Turns off the fans.

Figure 2-11 Fan Tray Block Diagram



Fan Tray Temperature Sensor

The temperature sensors (LM75) in the Fan Trays measure the exhaust temperatures of the Shelf. The temperature sensors are connected to Channel 3 of the Master-Only I²C-bus.

Fan Tray Control Board SEEPROM

The SEEPROM on the Fan Tray control board stores the FRU data and is connected to Channel 3 of the Master-Only I²C-bus.

Fan Tray Connectors and Indicators

Table 2-12, Figure 2-12, and Table 2-13 provide information on the fan tray LED indicators and backplane connector.

Table 2-12 LEDs on the Fan Tray Control Panel

Color	Description
Blue	Hot-Swap LED
Red	Alarm LED
Green	Fan tray OK LED

Figure 2-12 Fan Tray Backplane Connector

Table 2-13 Fan Tray Backplane Connector Pin Assignment

Pin Number	Signal	Pin Number	Signal
1	I^2C_PWER_A	13	GND
2	I^2C_PWR_B	14	FANTRAY_PRESENT
3	SCL	15	HA0
4	SDA	16	HA1
5	LED_FT_OK	17	INT#
6	LED_FT_FAIL	18	
7		19	VRTN_B
8	FAN_TK3	20	VRTN_A

Table 2-13 Fan Tray Backplane Connector Pin Assignment (Continued)

Pin Number	Signal	Pin Number	Signal
9	FAN_TK2	21	-48 V_B
10	FAN_TK1	22	-48 V_A
11	FAN_Speed	23	FAN_24V
12		24	FAN_PWR_RTN

Troubleshooting Fan Trays

Table 2-14 Fan Tray LED Indicators

Hot-Swap (Blue)	Ran Tray Alarm (Red)	Fan Tray OK (Green)	Tip
-	-	Green	Normal
Blue	Red	Green	1
-	-	-	2
-	Red	-	3
Flashing Blue	-	-	4
Blue	-	-	5

Table 2-15 Fan Tray LED Indicator Tips

Tip	Symptom	Action
1	LED test	1. The LEDs are tested when primary power is first applied to the chassis by turning on all LEDs, regardless of the true status, for a period of up to 15 seconds. 2. If one or more LEDs fail to illuminate, replace the Fan Tray.

Table 2-15 Fan Tray LED Indicator Tips (Continued)

Tip	Symptom	Action
2	No Fan Tray indicators on.	1. Check the Fan Tray for proper seating. 2. Verify that the Fan Tray is installed right side up. The Extraction Handle be down. 3. Remove Fan Tray and examine the Horizontal Board Connector on the Fan Tray for bent or broken pins. If pins are bent or damaged, replace the Fan Tray. 4. Flip the Fan Tray Air Dam on the chassis UP and examine the Fan Tray connector on the Horizontal Board for bent or broken pins. If pins are bent or damaged, replace the Chassis. 5. Replace the Fan Tray.
3	Fan Tray indicates Failure.	1. Check the Fan Tray for proper seating. 2. Remove Fan Tray and examine the Horizontal Board Connector on the Fan Tray for bent or broken pins. If Bent or damaged pins are discovered, replace the Fan Tray. 3. Flip the Fan Tray Air Dam on the chassis UP and examine the Fan Tray connector on the Horizontal Board for bent or broken pins. If bent or damaged pins are discovered, replace the Chassis. 4. Replace the Fan Tray.
4	Blue hot-swap LED is flashing	Fan tray is preparing for hot-swap
5	Blue hot-swap LED is on solid	Fan tray is ready to be removed (hot-swapped).

Power Entry Module (PEM)

WARNING Hazardous Voltage! Before working, ensure that the power is removed from the power connection cables. When the system is powered on, do NOT touch the power terminals.

Two pluggable redundant Power Entry Modules (PEMs) are located at the rear bottom side of the Shelf. Each PEM provides power terminals for four 30 A power feeds.

NOTE Although there are fuses in the power entry circuit of the Shelf, the power lines must be protected on rack level with 30 A breakers.

The power filtering consists of filtered power terminals and a discrete line-filter for each power input. The input voltage range for the Shelf is from -37 VDC to -72 VDC.

To indicate the presence of the PEM, a PEM presence signal is grounded by the PEM body. A Blue Hot-Swap LED and a Hot-Swap Push Button provide Hot-Swap functionality.

A red (power failure) and a green (OK) LED provide status indication. Each of the four redundant power-feeds supply power to a separate part of the ATCA Backplane.

PEM Components

Figure 2-13 PEM Components

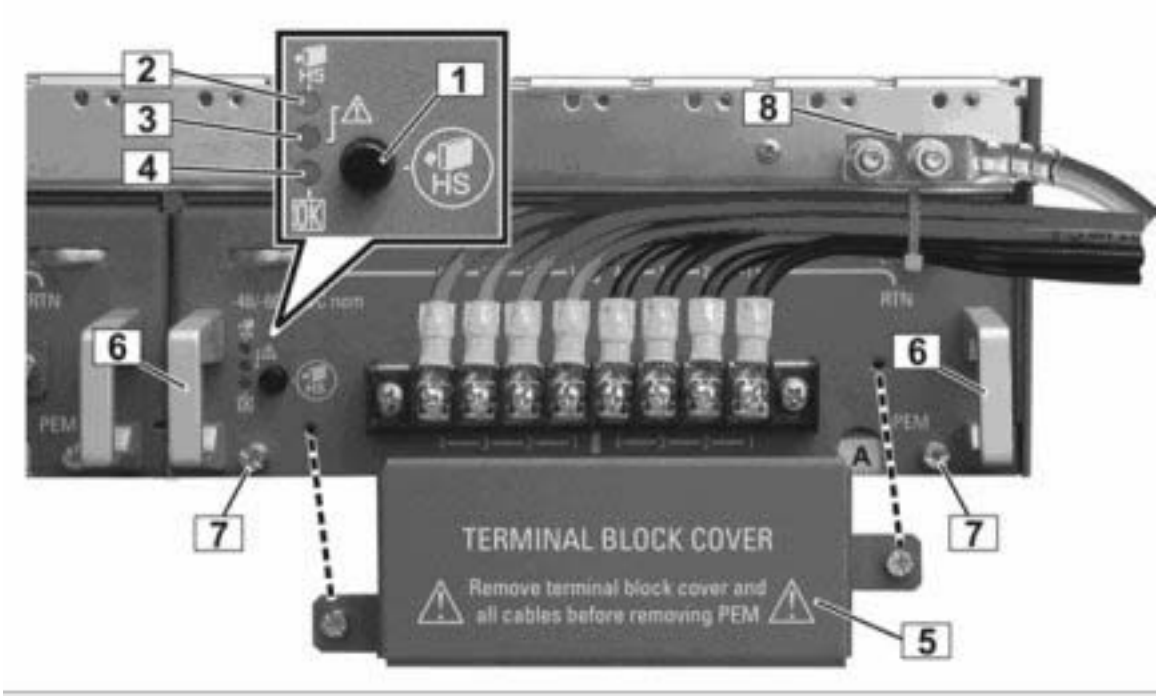
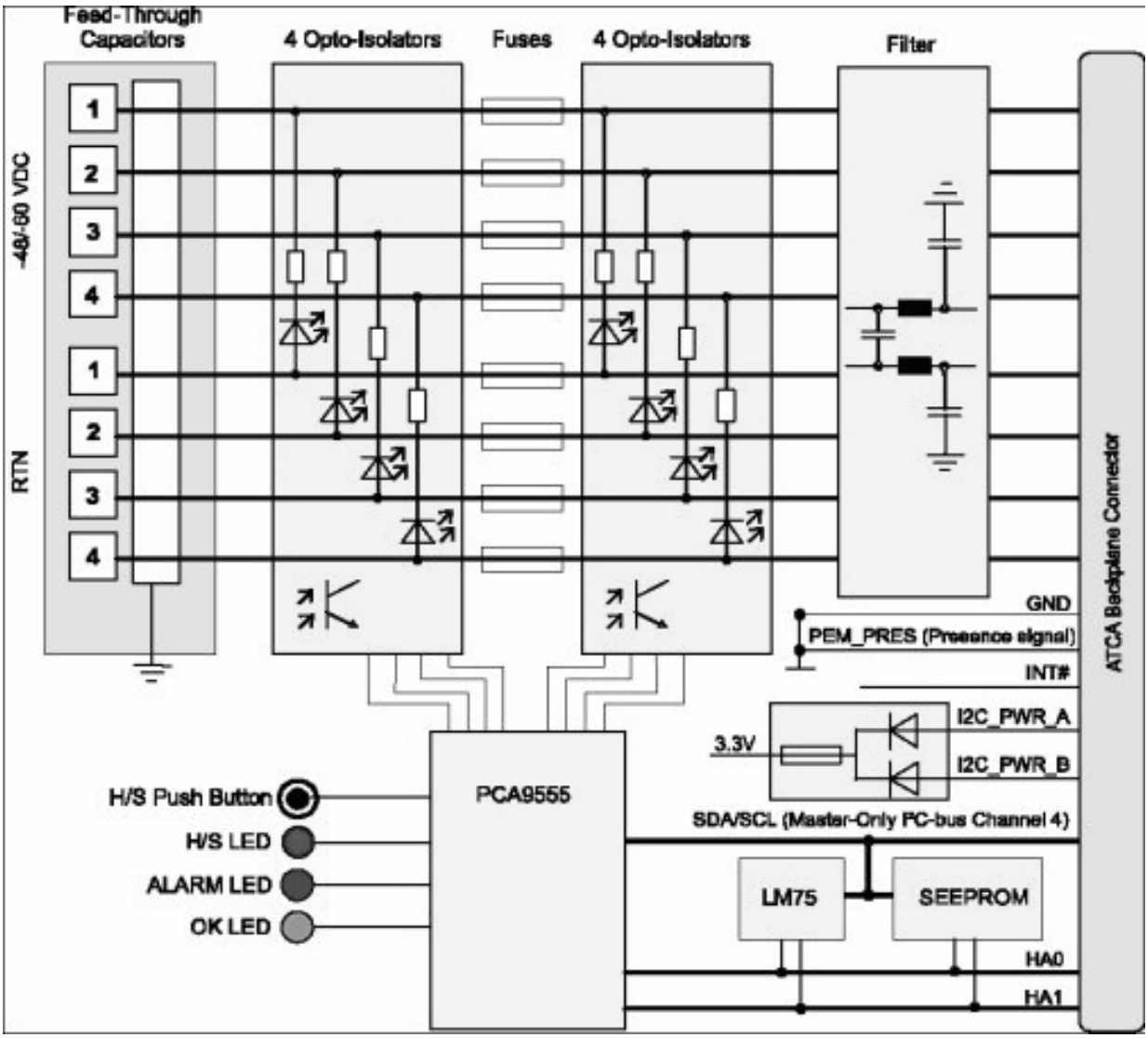


Table 2-16 PEM Components

1	Hot-Swap Push Button	5	Power Terminal Cover
2	Hot-Swap Push Button	6	Handle
3	PEM Alarm LED (red)	7	PEM fixing screws
4	PEM Alarm LED (red)	8	Shelf Ground Connection

Figure 2-14 PEM Block Diagram



PEM I/O Device

The PEM I/O device (PCA9555):

- Controls the status of the LEDs.
- Reads the status of the Hot-Swap push button.
- Reads the status of the -48 VDC inputs.

Table 2-17 PEM PCA Pin Assignments

PCA9555 I/O Pin	Function	State
0.0	Power input 2 Backplane connector present	-48 V present = 0 -48 V absent = 1 (3.3V)

Table 2-17 PEM PCA Pin Assignments (Continued)

PCA9555 I/O Pin	Function	State
0.1	Power input 2 behind the fuse present	-48 V present = 0 -48 V absent = 1 (3.3V)
0.2	Power input 1 at Backplane connector present	-48 V present = 0 -48 V absent = 1 (3.3V)
0.3	Power input 1 behind the fuse present.	-48 V present = 0 -48 V absent = 1 (3.3V)
0.4	N/C	Pulled High
0.5	N/C	Pulled High
0.6	Power input 4 Backplane connector present	-48 V present = 0 -48 V absent = 1 (3.3V)
0.7	Power input 4 behind the fuse present	-48 V present = 0 -48 V absent = 1 (3.3V)
1.0	Power input 3 Backplane connector present	-48 V present = 0 -48 V absent = 1 (3.3V)
1.1	Power input 3 behind the fuse present	-48 V present = 0 -48 V absent = 1 (3.3V)
1.2	N/C	Pulled High
1.3	Green LED	1 = On
1.4	Push-button switch	1 = Out, 0 = Pushed
1.5	Red LED	1 = On
1.6	N/C	Pulled High
1.7	Blue LED	1 = On

Troubleshooting the Power Entry Module

TABLE REF HERE

Table 2-18 Power Entry Modules LED Indicators

Hot Swap (Blue)	PEM Alarm (Red)	PEM OK (Green	Tip
-	-	Green	Normal
Blue	Red	Green	1

Table 2-18 Power Entry Modules LED Indicators (Continued)

Hot Swap (Blue)	PEM Alarm (Red)	PEM OK (Green	Tip
-	-	-	2
-	Red	-	3
Flashing Blue	-	-	4
Blue	-	-	5

Table 2-19 Power Entry Module Troubleshooting Actions

Tip	Symptom	Action
1	LED Test	1. The LEDs are tested when primary power is first applied to the chassis by turning on all LEDs, regardless of the true status, for a period of up to 15 seconds. 2. If one or more LEDs fail to illuminate, replace the Power Entry Module.
2	No Power Entry Modules indicators are on.	1. Check the Power Entry Module for proper seating. 2. Remove Power Entry Module and examine the Backplane connector on the Power Entry Module for bent or broken pins. If pins are bent or damaged, replace the Power Entry Module. 3. Examine the Power Entry Module mating connector on the backplane for bent or broken pins. If pins are bent or damaged, replace Chassis. 4. Replace the Power Entry Module.
3	Power Entry Module indicates Failure.	1. Check the Power Entry Module for proper seating. 2. Examine the connection between the Power Entry Cable and the Power Entry Module's terminal block. 3. Remove Power Entry Module and examine the Backplane connector on the Power Entry Module for bent or broken pins. If pins are bent or damaged, replace the Power Entry Module. 4. Examine the Power Entry Module mating connector on the backplane for bent or broken pins. If pins bent or damaged, replace the Chassis. 5. Replace the Power Entry Module.
4	Flashing Blue LED	PEM is preparing for hot-swap.

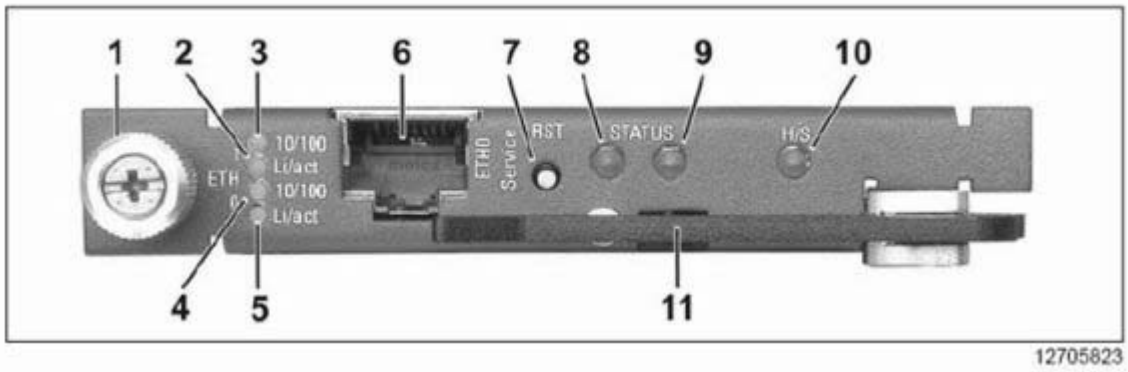
Table 2-19 Power Entry Module Troubleshooting Actions (Continued)

Tip	Symptom	Action
5	Blue LED on solid	PEM is ready for hot-swap. PEM may be safely removed from the chassis.

Shelf Manager LEDs

Front Panel Components

Figure 2-15 Shelf Manager Front Panel Components



1	Fixing screw	7	RESET push button
2	ETH 1 Link/Activity LED (green)	8	Shelf Manager Status LED (red)
3	ETH 1 Speed LED (yellow)	9	Shelf Manager Status LED (green)
4	ETH 0 Speed LED (yellow)	10	Hot Swap LED (blue)
5	ETH 0 Link/Activity LED (green)	11	Extraction handle
6	ETH 0 Ethernet Service Connector		

Ethernet Channels

The Shelf Manager Module provides two 10/100 Ethernet interfaces. The first Ethernet channel (ETH0) is routed to the jumpers JP40 through JP43 and then to either the RJ-45 connector on the front panel or to the backplane connector J2. The backplane routes this channel to the ShMC port on the corresponding Base Interface Hub board. The second Ethernet channel (ETH1) is routed to the other Base Interface Hub board (ShMC Cross Connect). Both Ethernet ports support 10 Mb (10BASE-T) and 100 Mb (100BASE-TX) connections.

The Shelf Manager Module provides two status LEDs for each Ethernet channel (ETH0 and ETH1). The LEDs are:

- Yellow LED indicates 100 Mb speed when lit.
- Green LED indicates link/activity when lit/blinking.

Hardware Redundancy Interface

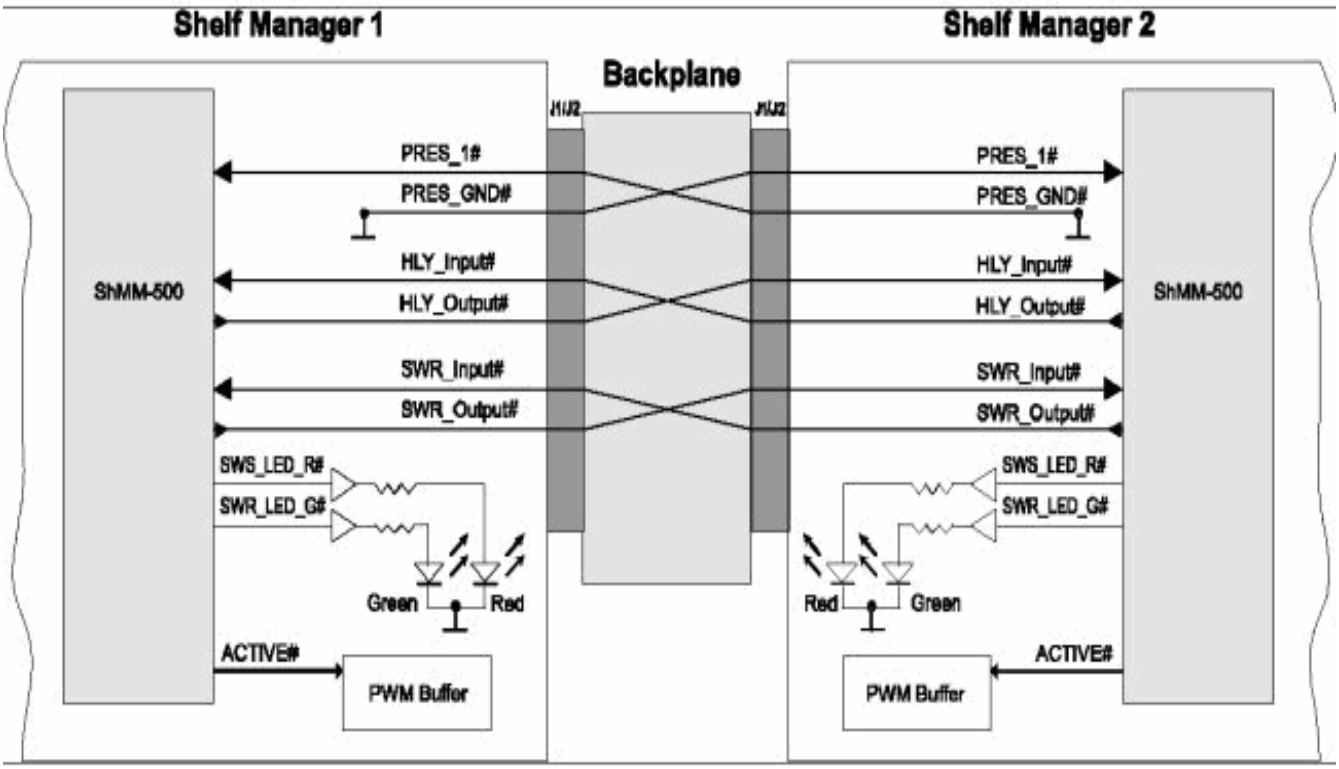
The Shelf Manager supports redundant operation with automatic switchover using redundant Shelf Managers. In a configuration where two Shelf Manager are present, one acts as the active Shelf Manager and the other as a standby. The Shelf Managers monitor each other and either can trigger a switchover if necessary.

The hardware redundancy interfaces of the Shelf Managers are as follows:

- Cross connected Shelf Manger present input (PRES_1#) and output (PRES_GND#).
- Cross connected Shelf Manger present input (PRES_1#) and output (PRES_GND#).
- Cross connected Shelf Manager health input (HLY_Input#) and output (HLY_Output#).
- Cross connected negotiation input (SWR_Input#) and output (SWR_Output#).[2]Active output from the ShMM-500 (ACTIVE#) that is used by the ShMM-ACB-IV to enable interfaces that must be exclusively driven by the active Shelf Manager, specifically PWM and fan tachometer buffers.
- Two status LEDs using the SWS_LED_G# (Green) and SWS_LED_R# (Red) signals.
- The PRES_1# signal is grounded on the redundant Shelf Manager. This indicates both Shelf Managers the presence of the other.

Figure 2-16 shows the hardware redundancy interface of the ShMM-ACB-IV.

Figure 2-16 Shelf Manager Redundancy Control



Hot-Swap LED

The Shelf Manager provides a blue Hot-Swap LED. This LED indicates when it is safe to remove the Shelf Manager from a powered Shelf.

Table 2-20 Hot-Swap LED

LED State	Condition
Off	The Shelf Manager is not ready to be removed/disconnected from the Shelf.
Blue	The Shelf Manager is ready to be removed/disconnected from the Shelf.
Long Blink	The Shelf Manager is activating itself.
Short Blink	Deactivation has been requested.

Troubleshooting the Shelf Manager

Use Table 2-21 and Table 2-22 to troubleshoot problems with the Shelf Manager.

Table 2-21 Shelf Manager Status LEDs

ETH1 Speed	ETH1 Activity (Green)	ETH0 Speed (Yellow)	ETH0 Activity (Green)	Shelf Manager Status (Red)	Shelf Manager Status (Green)	Hot Swap (Blue)	Tip
-	-	-	-	Off	On Green	Off	Normal (Active)
-	-	-	-	Off	Flashing Green	Off	Normal (Backup ShMM)
Off	-	Off	-	-	Green or Flashing Green	-	Normal (10 Mb)
Yellow	-	Yellow	-	-	Green or Flashing Green	-	Normal (100 Mb)
-	-	-	Green or Flashing Green	-	Green	-	Normal ETH0 Active
Yellow	Green	Yellow	Green	Red	Green	Blue	1
Yellow	Yellow	Yellow	-	Off	Green or Flashing Green	Off	2
Off	Off	Off	Off	Off	Off	Off	3

Table 2-21 Shelf Manager Status LEDs (Continued)

ETH1 Speed	ETH1 Activity (Green)	ETH0 Speed (Yellow)	ETH0 Activity (Green)	Shelf Manager Status (Red)	Shelf Manager Status (Green)	Hot Swap (Blue)	Tip
-	-	-	-	Red	-	-	4
-	-	-	-	-	-	Flashing Blue	5
-	-	-	-	-	-	Blue	6

Table 2-22 Shelf Manager Troubleshooting Tips

Tip	Symptom	Action
1	LED test	1. Does the shelf Manager have an LED test? 2. The LEDs are tested when the Shelf Manager is being re-booted by turning on all LEDs, regardless of the true status, for a period of up to 15 seconds. 3. If one or more LEDs fail to illuminate, replace the Shelf Manager.
2	ETH1 Activity GREEN LED is indicating a YELLOW color	The ETH1 Activity LED is GREEN and cannot show a yellow color. A yellow color may show when the adjacent Speed LEDs are on and the ETH1 Activity LED is off. The apparent yellow color is a light bleed through in the light pipes from the adjacent yellow LEDs. No corrective action is required.
3	Something is seriously wrong with the Shelf Manager and the Shelf Manager has probably hung.	1. Observe the other Shelf Manager to determine if it is in the Normal Active mode. 2. Press the reset button on the Shelf Manager exhibiting the problem using a pen or paperclip. 3. If after the reset button has been activated, the Shelf Manager does not reboot and enter the Normal Active or Normal Backup state, remove the Shelf Manager and • Examine the Shelf Manager's backplane connector for bent or broken pins. If bent or broken pins are discovered replace the Shelf Manager. • Examine the Shelf Manager connector on the backplane. If bent or broken pins are discovered replace the Chassis. 4. Replace the Shelf Manager.

Table 2-22 Shelf Manager Troubleshooting Tips (Continued)

Tip	Symptom	Action
4	Something is seriously wrong with the Shelf Manager and the Shelf Manager was able to indicate the failure.	1. Observe the other Shelf Manager to determine if it is in the Normal Active mode. 2. Press the reset button on the Shelf Manager exhibiting the problem using a pen or paperclip. 3. If after the reset button has been activated, the Shelf Manager does not reboot and enter the Normal Active or Normal Backup state, remove the Shelf Manager and • Examine the Shelf Manager's backplane connector for bent or broken pins. If bent or broken pins are discovered replace the Shelf Manager. • Examine the Shelf Manager connector on the backplane. If bent or broken pins are discovered replace the Chassis. 4. Replace the Shelf Manager.
5	Shelf Manager transitioning from active to inactive.	1. The Shelf Manager is transitioning from an active state to an inactive state. Wait until the LED becomes solid blue. If the blue hot swap LED on the Shelf Manager fails to stop flashing within 15 seconds, check the status of the other Shelf Manager. If that Shelf Manager is active, it is safe to remove the Shelf manager with the flashing blue LED from the chassis.
6	Shelf Manager ready for removal.	The Shelf Manager is inactive and may be removed from the chassis.

HP bc2100 ATCA Server Blade

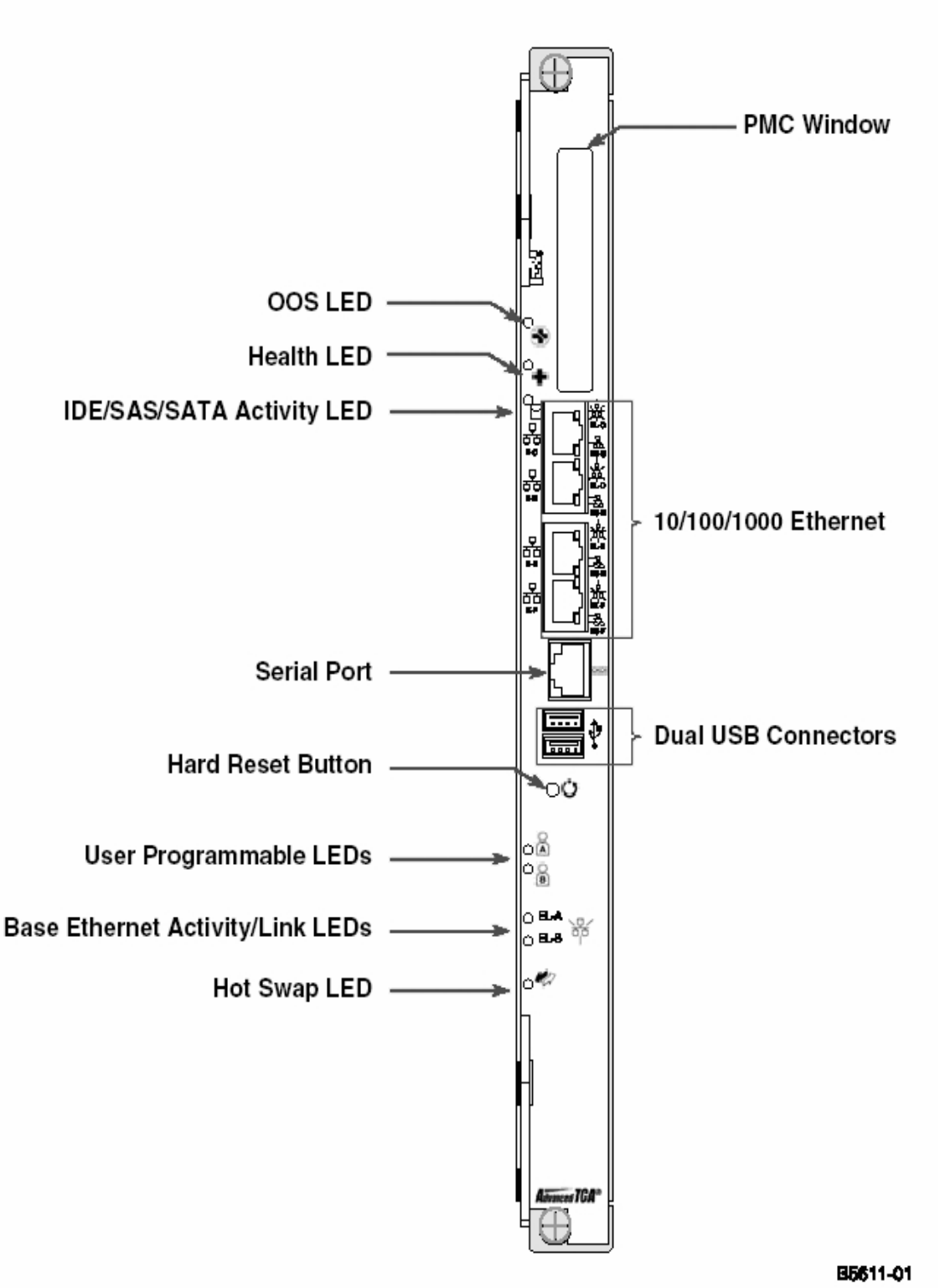
This section provides information on the HP bc2100 ATCA Server Blade front panel hard reset button and the LED indicators.

Front Panel LEDs

The HP bc2100 ATCA Server Blade front panel LEDs include the following: (as shown in Figure 2-17):

- One Out of Service (OOS) LED
- One Health LED
- One IDE/SAS/SATA Activity LED
- Eight 10/100/1000 Ethernet LEDs (For each Ethernet Channel)
- Two User Programmable LEDs
- Two Base Ethernet Activity/Link LEDs
- One Hot-Swap LED

Figure 2-17 HP bc2100 ATCA Server Blade Front Panel



Out of Service (OOS) LED

The HP bc2100 ATCA Server Blade supports one bi-color Out of Service (OOS) LED, mounted on the front faceplate. The OOS LED is identified by the following graphical legend on the faceplate, as shown in Figure 2-17:

The OOS LED can be driven to display a red or amber color. When this LED is lit, it indicates that the board is not in service. Its back-end (payload) power could be OFF or ON. Often the OOS state is entered when a critical fault occurs on the board. In this state, the back-end (payload) power is turned OFF. A board could be in this state when its back-end power is OFF but healthy, or when a board is fully powered but not yet deployed, or during the reset process.

NOTE Do not extract a board unless the Hot-Swap LED is lit.

Table 2-23 OOS LED (D59)

LED State	Meaning
Off	In service
Solid Amber/Red	Fault or error condition

The default color and override capabilities of the LED follow the LED management requirements defined in Section 3.2.5 of the PICMG 3.0 Specification. It is possible to override the default IPMC behavior of the LED using ATCA FRU LED Control commands.

Health LED

The HP bc2100 ATCA Server Blade supports one bi-color health LED to indicate the HP bc2100 ATCA Server Blade's health status, such as, whether a fault or error condition has been detected on the HP bc2100 ATCA Server Blade. This LED is mounted on the front faceplate, and is identified by the following graphical legend:

The Health LED is driven by the onboard IPMC. The health LED will only be driven to an error condition (red) if there is a critical or non-recoverable (major or critical in ATCA parlance) condition active on the HP bc2100 ATCA Server Blade. Alarms could include exceeding sensor thresholds for temperature and on-board logic voltages. The health LED remains red until the sensors return to a normal operating value. Hard-drive failures, boot failures, etc. are not considered critical/major IPMI states, so the IPMC does not explicitly set the health LED in these cases.

NOTE The LED's error state color default to red, but the color can be overridden using PICMG 3.0-defined commands.

Table 2-24 Health LED

LED Status	Meaning
Solid Green	Healthy
Solid Amber/Red	Fault or error condition

The default color and override capabilities of the LED follow the LED management requirements defined in Section 3.2.5 of the PICMG 3.0 Specification. It is possible to override the default IPMC behavior of the LED using ATCA FRU LED Control commands.

IDE Drive Activity LED

The IDE Drive Activity LED is located on the faceplate of the HP bc2100 ATCA Server Blade, as shown in Figure 2-17.

Table 2-25 IDE Drive Activity LED

LED Status	Meaning
Off	Normal/No disk access
Green (Blinking)	Disk access (read/write activity)

Network Link and Speed LEDs (10, 100, 1000 Mbps Ethernet)

The front panel of the HP bc2100 ATCA Server Blade provides two LEDs for each of the four Ethernet connections, which indicate the speed and link activity for that network connection (see Figure 2-17.

The Gigabit Ethernet (GbE) Network Link activity LEDs are identified by the following graphical legends located on the Server Blade front panel:

Network Link activity LED states are defined as shown in Table 2-26.

Table 2-26 Network Link Activity LEDs

For Channel A (L2) and Channel B (L6)	
Link LED Status	**Meaning**
Off	No link
Solid Green	Link Established
Blinking Green	Link with activity

The Gigabit Ethernet (GbE) Network Speed activity LEDs are identified by the following graphical legends located on the Server Blade front panel:

Network Speed activity LED states are defined as shown in Table 2-27.

Table 2-27 Network Speed LEDs

For Ethernet Controller Channel A (L3 and L4)		
Speed LED Status		**Meaning**
L3	**L4**	
Solid Yellow	Off	1 Gbps connection
Off	Solid Green	100 Mbps connection
Off	Off	10 Mbps connection
For Ethernet Controller Channel A (L7 and L8)		
Speed LED Status		**Meaning**
L7	**L8**	
Solid Yellow	Off	1 Gbps connection
Off	Solid Green	100 Mbps connection
Off	Off	10 Mbps connection

User-Programmable LEDs

The HP bc2100 ATCA Server Blade provides two bi-color LEDs for user-programmable functions. The LEDs can be driven to display a red, green or amber color. When these LEDs are illuminated, they indicate a status of a user-defined function. (Table 2-28).

Table 2-28 User-Programmable LED States

LED Status (Left)	LED Status (Right)	Meaning
Off	Off	No status
Red	Red/Green	Active Status of user defined function

The user-programmable LEDs are connected to the GPIO pins on the ICH device, as shown in Table 2-29.

Table 2-29 GPIO Pin Connections

LED	Pin
User_Prog_LED1_Red#	GPIO20
User_Prog_LED1_GRN#	GPIO21
User_Prog_LED2_Red#	GPIO28
User_Prog_LED2_GRN#	GPIO23

Ethernet Controller Port State (Base Ethernet Activity/Link) LEDs

The front panel of the HP bc2100 ATCA Server Blade provides a bi-color LED for each Ethernet channel that indicates the Ethernet port state. These LEDs can display a red, green or amber color (Table 2-30). The function of the port state LEDs is user definable. The Ethernet Controller SDP[6:7] GPIO bits for each channel are the outputs that control the LEDs. SDP[6] is connected to the Green LED, and SPD[7] is connected to the Red LED.

Table 2-30 Ethernet Controller Port State LEDs

LED Status (L1 and L5)	Meaning
Off	No status
Red, or Green, or Amber	Active status of user-defined function

Refer to the documentation for the Intel® 82546 Dual Gigabit Ethernet Controller for information on how to drive these LED signals. Note that existing network drivers may drive these GPIO pins.

Hot-Swap LED (DS10)

The HP bc2100 ATCA Server Blade can be hot-swapped in and out of a chassis. The onboard IPMC manages the HP bc2100 ATCA Server Blade power-up and power- down transitions.

The HP bc2100 ATCA Server Blade supports one blue Hot-Swap LED, mounted on the front panel. This LED indicates when it is safe to remove the HP bc2100 ATCA Server Blade from the chassis. The on-board IPMC drives this LED to indicate the hot-swap state. The Hot-Swap LED is identified by the following graphical legend on the Server Blade front panel:

When the lower ejector handle is disengaged from the faceplate, the hot-swap switch embedded in the PCB will assert a "HOT_SWAP_PB#" signal to the IPMC, and the IPMC will move from the M4 state to the M5 state. At the M5 state, the IPMC will ask the CMM (or Shelf Manager) for permission to move to the M6 state. The Hot-Swap LED will indicate this state by blinking on for about 100 milliseconds, followed by 900 milliseconds in the off state. This will occur as long as the HP bc2100 ATCA Server Blade remains in the M5 state. Once permission is received from the CMM or higher-level software, the HP bc2100 ATCA Server Blade will move to the M6 state.

The CMM or higher level software can reject the request to move to the M6 state. If this occurs, the Hot-Swap LED returns to a solid off condition, indicating that the HP bc2100 ATCA Server Blade has returned to M4 state.

If the HP bc2100 ATCA Server Blade reaches the M6 state, either through an extraction request through the lower ejector handle or through a direct command from higher-level software (and an ACPI-enabled OS is loaded on the HP bc2100 ATCA Server Blade) the IPMC communicates to the OS that the module must discontinue operation in preparation for removal. The Hot-Swap LED continues to flash during this preparation time, just like it does at the M5 state. When main board power is successfully removed from the HP bc2100 ATCA Server Blade, the Hot-Swap LED remains lit, indicating it is safe to remove the HP bc2100 ATCA Server Blade from the chassis (see Table 2-31).

CAUTION Removing the HP bc2100 ATCA Server Blade prematurely can lead to device corruption or failure.

Table 2-31 Hot-Swap LED (DS11)

LED Status	Meaning
Off	Normal status.
Blinking Blue	Preparing for removal/insertion: Long blink indicates activation is in progress, short blink when deactivation is in progress.
Solid Blue	Ready for hot-swap.

It is possible to override the default IPMC behavior of the LED using ATCA FRU LED Control commands.

Reset Button

The reset button is located in a small recessed hole below the USB ports. The reset button is used as an input to the IPMC to request a cold reset. There are IPMI commands to reset the board and change power states through the software. The reset button is a last resort, since you must be physically present at the chassis to reset the board. The reset button is located on the HP bc2100 ATCA Server Blade front panel (seeFigure 2-17).

Troubleshooting the HP bc2100 ATCA Server Blade

Table 2-32 HP bc2100 ATCA Server Blade LED States

Hot Swap (Blue)	Healthy (Red / Green)	Out of Service (Red)	Tip
Off	Green	Off	Normal
Off	Off	Off	1
Blue or Blinking Blue	Red	-	2

Table 2-32 HP bc2100 ATCA Server Blade LED States (Continued)

Hot Swap (Blue)	Healthy (Red / Green)	Out of Service (Red)	Tip
Off	Red	-	3
-	-	Red	4

Table 2-33 HP bc2100 ATCA Server Blade LED Tips

Tip	Symptom	Action
1	No Power	1. Examine other blades in the front card cage. If all Blades indicate no power, verify that the power is applied to the chassis and the Power Entry Modules are operational 2. Verify that the Server Blade s is fully inserted into the front card cage. If not, fully seat the blade. 3. Verify that the lower ejector level is fully closed. If the lever is open or partially open, fully close the lower ejector lever. 4. Remove the Server Blade its backplane connectors, especially the blue power connector, for bent or broken pins. If any pins are bent or broken, replace the Server Blade. 5. Examine the backplane's blade connectors for bent or broken pins. If any pins are bent or broken, replace the chassis.
2	Hot Swap Ejector open	1. Verify that the lower ejector handle is fully closed. The hot swap LED may remain illuminated or blinking if it is waiting to activate from the Shelf Manager. 2. If either ejector handle cannot be closed, replace the Server Blade. 3. If the lower hot swap handle is closed, retrieve the Mstate information from the Shelf Manager. 4. A blinking Hot Swap LED may indicate a failure in communications between the Server Blade and the Shelf Manager. Use information in the System Event Log (SEL) to identify chassis communication problems. If other FRUs are also encountering difficulty, replace the Chassis.

Table 2-33 HP bc2100 ATCA Server Blade LED Tips (Continued)

Tip	Symptom	Action
3	Voltage or temperature sensors are outside of threshold	1. Examine the other Blades in the Shelf. If all of the Healthy LEDs are illuminated red, there may be a power failure on one of the two redundant power busses. Make sure both power busses to the ATCA are on and Check both Power Entry Modules for proper operation. 2. If voltage and temperature sensors are within threshold, this indicates an internal hardware fault and inoperable IPMC. 3. Verify that other components are not experiencing the same failure. If they are a chassis level problem may be the cause, replace the chassis. 4. If the Server Blade is the only FRU experiencing exceeding thresholds, try pressing the Reset Button 5. If the Reset Button does not correct the problem, replace Server Blade.
4	The switch is held in RESET.	1. The Shelf Manager is holding the Server Blade as RESET. Follow the troubleshooting tips in "Diagnosing a Failed Shelf Manger Activation" in the Server Blade manual to extract the Shelf Manager information for further analysis. 2. If the Server Blade is still being held at RESET after troubleshooting the Shelf Manager, replace the Server Blade.
5		

Shelf Manager Redundant Operation

The active Shelf Manager exposes the ShMC device (address 20h) on IPMB, manages IPMB and the IPM controllers, and interacts with the System Manager over RMCP and other shelf-external interfaces. It maintains an open TCP connection with the backup Shelf Manager. It communicates all changes in the state of the managed objects to the backup Shelf Manager.

The backup Shelf Manager does not expose the ShMC on IPMB, does not actively manage IPMB and IPM controllers, and does not interact with the System Manager via the shelf-external interfaces, with one exception (noted later in this section). Instead, it maintains the state of the managed objects in its own memory (volatile and nonvolatile) and updates the state as directed by the active Shelf Manager.

The backup Shelf Manager may become active as the result of a switchover. The following two types of switchover are defined:

- Cooperative switchover: The active and backup Shelf Managers negotiate the transfer of responsibilities from the active to the backup Shelf Manager. This mode is supported via the CLI switchover command issued on the active or backup Shelf Manager.
- Forced switchover: The backup Shelf Manager determines that the active Shelf Manager is no longer alive or healthy, and forcefully takes on the responsibilities of the active Shelf Manager.

The backup Shelf Manager recognizes the departure of the active Shelf Manager when the Remote Healthy or Remote Presence low-level signal becomes inactive. Remote Presence signal monitors the presence of the peer Shelf Manager; this signal going inactive means that the board hosting the peer Shelf Manager has been removed from the shelf. The Remote Healthy signal is set by the peer Shelf Manager during initialization; this signal going inactive means that the remote Shelf Manager has become unhealthy (typically, has been powered off or reset).

Another situation that needs some action from the backup Shelf Manager is when the TCP connection between the Shelf Managers closes. This happens either when the communication link between the two Shelf Managers gets broken or when the shelfman process on the active Shelf Manager terminates (in a voluntary or involuntary way, or due to a software exception). Also, because the keepalive option is enabled on the TCP connection, it will close shortly after the active ShMM is switched off or reset. In the case of Shelf Manager termination, it is possible that the TCP connection is closed before the Remote Healthy signal becomes inactive. So, in order to determine why the TCP connection closed, the backup Shelf Manager samples the state of the Remote Healthy signal immediately and, if it is still active, again after some delay. If the Remote Healthy signal ultimately becomes inactive, the backup Shelf Manager concludes that the active Shelf Manager is dead and initiates a switchover.

Otherwise, if the Remote Healthy signal stays active, the backup Shelf Manager concludes that the communication link between the Shelf Managers is broken. In that case, no switchover is initiated. Instead, the backup Shelf Manager repeatedly re initializes itself and tries to establish a connection with the active Shelf Manager until the communication link is restored. Reinstallation is achieved by rebooting the ShMM and automatically restarting the Shelf Manager after the reboot. Special logic in the Shelf Manager guarantees that it does not try to become active at startup if the peer Shelf Manager is already active.

The Shelf Manager uses a watchdog timer to protect against becoming unresponsive due to infinite loops or other software bugs. In the event the watchdog timer on the active Shelf Manager triggers, that ShMM will be reset, causing the Remote Healthy signal on the backup ShMM to become inactive, thus triggering a switchover.

3 Diagnostics

Introduction

The HP bh5700 ATCA 14-Slot Blade Server component diagnostics are to be run in offline mode. The operating system must not be loaded and the component to be tested must not be in operation. The diagnostics described in this document are intended to be used by trained Hewlett-Packard field engineers or Network Equipment Providers (NEPs).

CAUTION **Entering these diagnostic commands on a running system can cause the system to halt operations with data loss.**

The diagnostics provide the ability to isolate hardware failures to the Field Replaceable Unit (FRU) for each component.

The diagnostics can be run remotely and (where applicable) meet software guidelines for Linux open source code mandated by the Advanced Telecom Computing Architecture (ATCA) specification.

The component diagnostics are not required to have a unified front-end interface for all components, as each component will have its own diagnostic environment.

General ATCA Diagnostics for the Shelf Management Module (ShMM)

The ATCA specification defines provisions for diagnosing ATCA components through the Shelf Management Module, or “Shelf Manager” (ShMM). The ShMM functionality includes a command line interface (clia) that can provide detailed diagnostic and management functions for all other configured ATCA components within the HP bh5700 ATCA 14-Slot Blade Server. This section provides information on the ShMM diagnostic capabilities only, and does not cover management.

Using the Command Line Interface

Using the `clia` interface, commands can be either manually entered one at a time or in the `clia` interactive shell. To enter diagnostic commands, telnet to the ShMM (via the Ethernet Switch Blade if necessary), then enter the `clia` command line environment as follows:

`clia` <enter>

`CLI>`

Or, enter a `clia` command directly from the Linux prompt:

`clia <command>` <enter>

The `clia` interface provides access to on-board help that either lists all commands (when used without arguments) or provides detailed help for a specific command when the command name is provided (Example: `help alarm`).

Diagnostic Commands

Command-line interface diagnostic and support commands are listed here. Table 3-1 lists available ShMM diagnostic commands.

Table 3-1 ShMM Diagnostic Commands

Command	Function
`board`	Used to print the status of a device in the chassis
`boardreset`	Used to reset a board (based on physical slot address).
`deactivate`	Deactivates a FRU.
`debuglevel`	Sets the level of debug messages.
`fans`	Reads the level of fan speed and status.
`fru`	Reads information about a specific FRU.
`fruinfo`	Dumps FRU data in a user friendly format.
`frucontrol`	Issues commands to a FRU (such as reset).
`getthreshold`	Gets the current thresholds for a sensor.
`ipmc`	Reads information about an IPM controller.
`sel`	Read or Clear the SEL (System Event Log).
`sensor`	Gets information on a sensor.
`sensordata`	Shows the actual value for a sensor.

Table 3-1 ShMM Diagnostic Commands (Continued)

Command	Function
shelf	Display information about various shelf subsystems.
showunhealthy	Show all unhealthy FRUs.

board [physical slot #]

board is used to print status and information about a board in the chassis. The command displays the Device ID String, the How Swap State, and the reason the previous Hot Swap State change was made. This information is useful when FRUs have transitioned from active to inactive due to a fault.

Running the command without any arguments will display the status for all boards in the chassis.

```
CLI>  board 7

IPM Sentry Shelf Manager Command Line Interpreter

Physical Slot # 7

82: Entity: (0xa0, 0x60) Maximum FRU device ID: 0x00

    PICMG Version 2.1

    Hot Swap State: M4 (Active), Previous: M3 (Activation In Process), Last State
Change Cause: Normal State Change (0x0)

82: FRU # 0

    Entity: (0xa0, 0x60)

    Hot Swap State: M4 (Active), Previous: M3 (Activation In Process), Last State
Change Cause: Normal State Change (0x0)

    Device ID String: "Switch"

CLI>
```

boardreset <physical slot #>

boardreset will reset a board in a given physical slot #.

```
CLI> boardreset 9

    Board 9 reset, status returned 0
```

deactivate <addr> <fru_id>

Deactivate the specified FRU. Instead of the IPMB bus address and FRU ID, a board, ShMM, power supply, or fan tray ID may also be provided (see Help text for details).

```
CLI> deactivate 88 0

    Command issued via IPMB, status = 0 (0x0)

    Command executed successfully
```

debuglevel [mask]

The `debuglevel` command raises or lowers the debug level for the ShMM. If the status of the ShMM is suspect, raising the debug level may assist in debugging the problem. The default debug level is 0x0007 (Errors, Warnings, and Informational Messages). Valid levels are:

0x0001 - Error messages
0x0002 - Warning messages
0x0004 - Informational messages
0x0008 - Verbose informational messages
0x0010 - Trace messages
0x0020 - Verbose trace messages
0x0040 - Messages displayed for important commands sent to the IPM controllers during their initialization
0x0080 - Verbose messages about acquiring and releasing internal locks

```
CLI> debuglevel 0x1f
```

Debug Mask is set to 0x001f

fans [addr] [fru_id]

The `fans` command displays information about the fan speed and status. A slot number, fan board number, or power supply number may be used instead of the address. Running the command with no arguments will display the status for all fans. Refer to the *HP bh5700 ATCA 14-Slot Blade Server Shelf User Guide* for details.

```
CLI> fans

20: FRU # 3

Current Level: 6 "Automatic"
Minimum Speed Level: 0, Maximum Speed Level: 15

20: FRU # 4

Current Level: 255 "Automatic"
Minimum Speed Level: 0, Maximum Speed Level: 15

20: FRU # 5

Current Level: 255
Minimum Speed Level: 0, Maximum Speed Level: 15
```

fru [addr]

The `fru` command displays information about a specified FRU. The `fru` command provides the same functionality as the `board` command. The command will display information such as the Device ID String, the Hot Swap State, and why the previous Hot Swap State change was made. As an example, this could explain that an active device was transitioned to inactive due to a fault. Running the command without any arguments will display the status for all FRUs.

```
CLI> fru

10: FRU # 0

    Entity: (0xf0, 0x60)
```

```
    Hot Swap State: M4 (Active), Previous: M3 (Activation In Process), Last State
Change Cause: Normal State Change (0x0)
    Device ID String: "IPM Sentry ShM"


12: FRU # 0
    Entity: (0xf0, 0x60)
    Hot Swap State: M7 (Communication Lost), Previous: M4 (Active), Last State Change
Cause: Unknown (0xf)
    Device ID String: "IPM Sentry ShM"


20: FRU # 0
    Entity: (0xf0, 0x1)
    Hot Swap State: M4 (Active), Previous: M3 (Activation In Process), Last State
Change
 Cause: Normal State Change (0x0)
    Device ID String: "IPM Sentry BMC"
```

fruinfo <addr> <fru_id>

The `fruinfo` command displays FRU data in an easily readable format. Refer to the example below to see what fields are displayed.

```
CLI> fruinfo 84 0


84: FRU # 0, FRU Info
Common Header:    Format Version = 1


Board Info Area:
    Version     = 1
    Language Code            = 0
    Mfg Date/Time            = Feb 25 23:32:00 2006 (5340932 minutes since 1996)
    Board Manufacturer       = ZNYX Networks
    Board Product Name       = ZX6000D-HP
    Board Serial Number      = 01BZ0X111HWP
    Board Part Number        = 700-0170-003
    FRU Programmer File ID   = 03
Product Info Area:
    Version     = 1
    Language Code            = 0
```

```
    Manufacturer Name         = ZNYX Networks
    Product Name              = ZX7120-HP
    Product Part / Model#     = 700-0174-002
    Product Version           =
    Product Serial Number     = 01CS00111HWP
    Asset Tag                 =
    FRU Programmer File ID    = 03

Multi Record Area:
    PICMG Board Point-to-Point Connectivity Record (ID=0x14)
        Version = 0

    PICMG Board Point-to-Point Connectivity Record (ID=0x14)
        Version = 0

CLI>
```

frucontrol <addr> <fru_id> <command>

The `frucontrol` command sends commands directly to a FRU. The commands available are:

- `cold_reset`
- `warm_reset`
- `graceful_reboot`
- `diagnostic_interrupt`

```
CLI> frucontrol 88 0 graceful_reboot
    FRU Control: Controller 0x88, FRU ID # 0, command 0x02, status 204(0xcc)
```

getthreshold <addr> [lun:][sensor #]

The getthreshold command reads or sets sensor thresholds. For temperature sensors, getthreshold returns information about the current temperature and can set the critical threshold.

NOTE Use the sensor command first to locate the sensors before using these commands.

```
CLI> getthreshold 82 0:11

82: LUN: 0, Sensor # 11 ("Top Temp")
```

```
    Type: Threshold (0x01), "Temperature" (0x01)

        Lower Non-Critical Threshold, Raw Data: 0x0a, Processed Data: 10.000000
degrees C

        Lower Critical Threshold, Raw Data: 0x05, Processed Data: 5.000000 degrees C

        Lower Non-Recoverable Threshold, Raw Data: 0x00, Processed Data: 0.000000
degrees C

        Upper Non-Critical Threshold, Raw Data: 0x28, Processed Data: 40.000000
degrees C

       Upper Critical Threshold, Raw Data: 0x3c, Processed Data: 60.000000 degrees C

        Upper Non-Recoverable Threshold, Raw Data: 0x50, Processed Data: 80.000000
degrees C
```

ipmc [addr]

The ipmc command displays information about the ipmc controllers. Information about all the IPMC controllers in the server is displayed when the command is run with no arguments. This command is similar to the board and fru commands.

```
CLI> ipmc 10

10: Entity: (0xf0, 0x60) Maximum FRU device ID: 0x08

    PICMG Version 2.1

    Hot Swap State: M4 (Active), Previous: M3 (Activation In Process), Last State
Change Cause: Normal State Change (0x0)
```

sel [-v] [info] or [clear]

The sel command displays and manages the System Event Log (SEL). The SEL contains all errors and warnings reported by the system. The SEL is the main log that support engineers use to isolate problems in the system. Running this command with no arguments will dump the entire SEL, which may be long. The info argument displays the size and status of the SEL. The clear command will clear the SEL. The –v (verbose)flag displays more verbose output.

```
CLI> sel

0x0083: Event: at Jan  9 14:04:16 1970; from:(0x88,0,0); sensor:(0x22,14);
event:0x6f(asserted): 0x0C 0xFF 0xFF

0x0084: Event: at Jan  9 15:29:32 1970; from:(0x88,0,0); sensor:(0x1b,10);
event:0x3(asserted): 0x01 0xFF 0xFF

0x0085: Event: at Jan  9 15:29:38 1970; from:(0x88,0,0); sensor:(0x1b,10);
event:0x3(asserted): 0x00 0xFF 0xFF

0x0086: Event: at Jan  9 15:29:38 1970; from:(0x88,0,0); sensor:(0x22,14);
event:0x6f(asserted): 0x0C 0xFF 0xFF

0x0087: Event: at Jan 10 02:12:28 1970; from:(0x88,0,0); sensor:(0x1b,10);
event:0x3(asserted): 0x01 0xFF 0xFF

0x0088: Event: at Jan 10 02:12:33 1970; from:(0x88,0,0); sensor:(0x1b,10);
event:0x3(asserted): 0x00 0xFF 0xFF
```

```
0x0089: Event: at Jan 10 02:12:33 1970; from:(0x88,0,0); sensor:(0x22,14);
event:0x6f(asserted): 0x0C 0xFF 0xFF

0x008A: Event: at Jan 10 04:30:24 1970; from:(0x88,0,0); sensor:(0x1b,10);
event:0x3(asserted): 0x01 0xFF 0xFF

0x008B: Event: at Jan 10 04:30:29 1970; from:(0x88,0,0); sensor:(0x1b,10);
event:0x3(asserted): 0x00 0xFF 0xFF

0x008C: Event: at Jan 10 04:30:29 1970; from:(0x88,0,0); sensor:(0x22,14);
event:0x6f(asserted): 0x0C 0xFF 0xFF

0x008D: Event: at Jan 10 20:58:41 1970; from:(0x88,0,0); sensor:(0x1b,10);
event:0x3(asserted): 0x01 0xFF 0xFF
```

sensor [<addr> [[lun:]<sensor id>]

The `sensor` command displays information about a sensor. Sensors include power and temperature sensors. Running the command with no arguments shows information for all sensors in the system. The `sensor` command is used in conjunction with the `sel` command to analyze SEL failures. For example:

CLI> sel –v

0x000C: Event: at: Aug 16 05:26:28 2005; from IPM Controller: 0x8c, LUN: 0,

Channel: 0

"System Firmware Progress (formerly POST Error)" (0x0f) sensor # 6

"Sensor-specific" (0x6f) event Asserted

"System Firmware Progress"

Sensor specific code 1: 0x13

0x000D: Event: at: Aug 16 05:26:28 2005; from IPM Controller: 0x8c, LUN: 0,

Channel: 0

"System Firmware Progress (formerly POST Error)" (0x0f) sensor # 6

"Sensor-specific" (0x6f) event Asserted

"System Firmware Progress"

Sensor specific code 1: 0x13

In this example, the failures show that IPM controlled 0x8c, sensor 6, is reporting problems. This is a System Firmware progress sensor, as stated in the text. Using the sensor command gives additional information on the failure.

```
CLI> sensor –v 8c 6


8c: LUN: 0, Sensor # 6 ("Sys FW Progress")
    Type: Discrete (0x6f), "System Firmware Progress (formerly POST Error)"
(0x0f)
    Belongs to entity: (0xa0, 97) [FRU # 0]
```

```
    Assertion Mask: 0x0001
        System Firmware Error
    Deassertion Mask: 0x0001
    Settable / Readable Mask: 0x0001
        System Firmware Error
```

sensordata [<addr> [[lun:]<sensor id>]

The sensordata command displays the current value for a sensor.

```
CLI>  sensordata 82 0:12
82: LUN: 0, Sensor # 12 ("Bottom Temp")
    Type: Threshold (0x01), "Temperature" (0x01)
    Status: 0xc0
        All event messages enabled from this sensor
        Sensor scanning enabled
        Initial update completed
    Raw data: 28 (0x1c)
    Processed data: 28.000000 degrees C
    Status: 0x00
```

shelf <sub-command>

The shelf command displays information on the following list of valid sub-commands:

- address_table
- cooling_state
- fans_state
- power_distribution
- power_management
- pci_connectivity
- ha_connectivity
- h110_connectivity
- point-to-point_connectivity
- MaxCurrent [feed] <Amps>
- MinVoltage [feed] <Volts>
- Activation <addr> <fru_id> 1/0
- Deactivation <addr> <fru_id> 1/0

- BDSelGrounded <slot number> 1/0 (1 means Enabled, 0 means Disabled)
- PwrCapability <addr> <fru_id> <Watts>
- PwrDelay <addr> <fru_id> <10ths_of_second>
- Allowance <seconds>
- PwrReorder <addr1> <fru_id1> before/after <addr2> <fru_id2>
- info_refresh
- info_force_update

showunhealthy

The showunhealthy command displays information on failing or substandard FRUs in the system. It lists all FRUs that are reporting an unhealthy condition such as FRUs that have temperature or power problems, or FRUs that have lost connectivity to the ShMM.

```
CLI> showunhealthy


12: FRU # 0 (Controller)

   Hot Swap State: M7 (Communication Lost), Previous: M4 (Active), Last State Change
Cause: Unknown (0xf)


8c: FRU # 0 (Controller)

   Hot Swap State: M7 (Communication Lost), Previous: M4 (Active), Last State Change
Cause: Unknown (0xf)
```

Shelf Manager (ShMM) Functional Specifications

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ShMM Diagnostics Functionality and Features

The ShMM has three levels of diagnostics. The first level runs during Power-On-Self-Test (POST), and runs a self-check on the board. The results of this test are available using the `dmesg` command from the ShMM's Linux operating environment.

The second level is a CPU error-monitoring daemon that runs in the background and reports all CPU errors to the SEL.

The third level consists of run-time tests that are executed from the Linux operating environment on the ShMM. To run these tests, you must connect to the ShMM console port or connect via telnet in order to access the ShMM shell prompt.

IMPORTANT Ensure that these test are invoked only from the backup ShMM, and NOT from the active ShMM. You can use the `clia shmstatus` and `clia switchover` commands to determine or change the ShMM's current status.

ShMM Diagnostics Performance

There are two levels of POST test on the ShMM (see Valid Configurations, below). The ARP test takes up to 20 seconds to complete. All other tests complete within a few seconds.

ShMM Diagnostics Security

The results of the POST test are available by logging into the ShMM. They are displayed using the `dmesg` command. By logging into the ShMM you can view the results of the POST tests. The results can also be viewed using the U-boot firmware menu interface `log show` command. A serial connection to the ShMM is required to use this. Tests may be configured from the U-boot interface using the environment variables (see Valid Configurations, below).

The online tests are available to all users who have execute permissions to the test files.

ShMM Diagnostics Valid Configurations

Valid diagnostics configurations include:

- Power-on Self Test (POST)
- Online Tests
- CPU Error Daemon

Power-on Self Test (POST)

The POST tests are included as part of the onboard firmware. They are divided into three groups:

- Tests run on power-on booting only
- Tests run on normal booting (on each reboot)

- Manually executed tests

The categories that are run and when the tests run are controlled by the U-boot environment variables `post_normal` and `post_poweron`. These variables are accessible from the pre-boot firmware menu, over a serial console connection. The variables are described below:

post_normal (U-boot environment variable)

post_normal determines the list of POST tests that are run on each boot-up. If it is not set, compile-time default settings are used. The test names are separated by the space character.

post_poweron (U-boot environment variable)

post_poweron determines the list of POST tests that are run after power-on reset. If it is not set, compile-time default settings are used. The test names l are separated by the space character.

These variables are controlled from the U-boot environment with `setenv` and `printenv`. The syntax from the firmware menu is:.

```
shmm printenv [<variable>]
```

```
shmm setenv <variable> <value>
```

To make environment variable changes permanent, run the `saveenv` command. The syntax is:

```
saveenv
```

Manual tests can be run from the firmware menu. To run these tests, a serial connection is required.

The steps to run manual tests are:

1. After connecting to the serial port, reboot the ShMM.
2. Interrupt the ShMM Boot when it prints “Hit any key to stop autoboot:”.
3. At the “shmm” menu prompt, use the `diag` command to run diagnostics

Online Tests

NOTE The online memory tests (mem01 and mem02) are provided by Hewlett-Packard as standalone executables which can be installed on the ShMM-500's embedded linux OS. The other online tests are part of the embedded OS firmware.

Online tests are run from a booted ShMM. Most tests require no setup or configuration. For the external UART test, a loopback cable is required and the ARP test requires correct Ethernet wiring and configuration. Details on these requirements are in the following sections.

CPU Error Daemon

The CPU error daemon runs in the background on a booted ShMM's Linux operating environment. This capability is included with the base software/firmware for the ShMM.

Shelf Manager (ShMM) Diagnostics User Interface

ShMM Diagnostics Overall Interface Description

This section describes the ShMM diagnostics interface.

Power-On Self Tests

Power-On Self-Test (POST) diagnostics run at power-on and during boot. Six areas are tested by POST:

- memory – tests SDRAM
- i2c – checks the I^2C bus
- uart – tests the UARTs
- ethernet – tests the Ethernet port
- crc – performs a CRC check on the ROM
- ipmb – tests the ipmb bus (This test is currently disabled)

POST reports PASS or FAIL for each test. POST tests can be run manually from the U-boot firmware menu.

Online Tests

There are two types of online tests: Hardware and memory.

The hardware tests exercise the ports and test the checksums of the firmware. The memory tests verify the memory interfaces in the kernel and that the memory is free of faults

NOTE The ShMM does not have the ability to report single-bit memory errors.

Hardware Tests

The available hardware tests are:

- `shmm_uart_test` – tests the UARTs
- `shmm_eth_test` – tests the Ethernet interfaces
- `shmm_crc_test` – tests the firmware checksums

Memory Tests

- `mem01` – malloc's all available memory to ensure that the memory is clean
- `mem02` – tests all the kernel memory interfaces (malloc, calloc, and so on), and Reads/Writes this memory.

These test are usually run from the shell and may be included in scripts. The following example will run the mem02 test until it is interrupted by the user.

```
# while true
> do
```

```
> mem02
> sleep 5
> done
```

Additional information on the memory tests is found in the section “Memory tests” on page 136.

CPU Error Daemon

The CPU error monitoring daemon runs in the background and reports CPU errors to /var/log/messages. It is part of the ShMM standard operating environment.

ShMM Diagnostics UI Syntax and Semantics

Power-On Self Test (POST)

POST output is available from the U-boot firmware menu using the log show command (information on connecting a serial console to access the U-boot menu is below). The output is also available from the ShMM Linux shell after the boot operations are complete using the dmesg command.

```
#dmesg
   POST memory PASSED
   POST i2c PASSED
   POST uart PASSED
   POST ethernet PASSED
   POST crc PASSED
```

dmesg shows additional status and message information about the startup of the system.

The tests may be run manually from the ShMM firmware menu. The diag command is used to run the tests. A serial console connection is required to access the firmware menu.

1. Connect to the serial port and reboot the ShMM.
2. Interrupt the ShMM boot when it prints “Hit any key to stop autoboot”.
3. At the shmm menu prompt use the diag command to run the test
4. At the shmm menu prompt use the log show command to display the test results

```
> shmm diag run i2c
> shmm log show
 POST i2c PASSED
```

NOTE The POST memory test cannot be run manually, as it is destructive and would overwrite the SDRAM that the ShMM firmware is using.

Online Tests

The online tests discussed in this section are available in the `/bin` directory. If these utilities do not exist in the `/bin` directory on the ShMM, please contact Hewlett-Packard support for assistance.

shmm_uart_test [-e]

NOTE The external test (-e) requires a loopback cable. Before running the test verify that the loopback cable is properly installed. The test will fail with a "Timeout occurred" message if the loopback cable is not installed.

The `shmm_uart_test` checks the internal interfaces of the UARTs. The `–e` flag checks the external interfaces as well. The valid UARTs are 0 and 3. Both are tested by this test.

This test returns 0 on success and -1 on failure. The possible failure messages:

- Timeout occurred - the interface timed out
- Invalid symbol occurred - data was corrupted in transmission
- Unknown error

Below is an example of running the tests without the loopback cables installed.

```
# shmm_uart_test
Performing Internal UART Tests...
        Testing UART 0: PASSED.
        Testing UART 3: PASSED.

# shmm_uart_test -e
Performing Internal UART Tests...
        Testing UART 0: PASSED.
        Testing UART 3: PASSED.
Performing External UART Tests...
Note: A loopback cable is required for these tests
        Testing UART 0: FAILURE: Timeout occurred
        Testing UART 3: FAILURE: Timeout occurred
```

shmm_eth_test [-a <ip_addr>]

NOTE The external test (-e) requires a loopback cable. Before running the test verify that the loopback cable is properly installed. The test will fail with a "Timeout occurred" message if the loopback cable is not installed.

The `shmm_eth_test` checks the ethernet interfaces on the ShMM. Three tests are run to verify proper operation of the interfaces: internal checks, PHY and ARP tests. The internal and PHY tests are run automatically and the ARP test is run when the `-a` flag is used. When the –a argument is added with a valid IP address, the ARP test will send ARP packets to the target IP address and wait for a response. Two Ethernet ports are exercised by this test.

This test returns 0 on success and -1 on failure. The possible failure messages are:

- Timeout occurred - the interface timed out
- Packets do not match - data was corrupted in transmission
- Unknown error

Below is an example of running the tests without the loopback cables installed.

```
# shmm_eth_test
Performing Internal Ethernet Tests...
        Testing MAC 0: PASSED.
        Testing MAC 1: PASSED.
Performing PHY Ethernet Tests...
        Testing MAC 0: PASSED
        Testing MAC 1: PASSED
# shmm_eth_test -a 10.0.0.42
Performing Internal Ethernet Tests...
        Testing MAC 0: PASSED.
        Testing MAC 1: PASSED.
Performing PHY Ethernet Tests...
        Testing MAC 0: PASSED
        Testing MAC 1: PASSED
Performing ARP Ethernet Tests...
Each test will wait 10 seconds for the ARP packet to return
        Testing MAC 0: FAILURE: Timeout occurred
        Testing MAC 1: FAILURE: Timeout occurred
```

shmm_crc_test

This test will validate the checksums (CRCs) of the firmware images on the ShMM. It will iterate through all firmware images, and will return 0 on success and -1 on an error. There are four possible error messages:

- Checksum does not match
- No signature detected
- Invalid image
- Unknown type of image

For example:

```
# shmm_crc_test
Performing CRC Checksum Tests...
        Testing MTD IMAGE 0: FAILURE:  Unknown type of image.
        Testing MTD IMAGE 1: FAILURE:  Unknown type of image.
        Testing MTD IMAGE 2: PASSED.
        Testing MTD IMAGE 3: PASSED.
```

Memory tests

NOTE Online memory tests are not installed on the system delivered from the factory. If you need to run the memory tests, they must be installed on the ShMM's Linux operating environment file system following the instructions provided by Hewlett-Packard. To ensure the tests remain accessible after rebooting the shelf manager, it is recommended that the files be installed in `/var/bin`. After installing and setting execute permissions on the files, the following mem01 and mem02 tests are available.

mem01

The `mem01` test allocates a large chunk of memory and fills it, forcing a real physical allocation. This test does not detect single bit memory errors as the ShMM does not support reporting of these errors. Errors detected by this test will likely cause a panic or reboot. `mem01` does not test memory already in use by the processes and the kernel.

Running the command with the –h option displays usage information.

```
# mem01 -h
  -c n    Run n copies concurrently
  -e      Turn on error logging
  -f      Turn off functional testing
  -h      Show this help screen
  -i n    Execute test n times
  -I x    Execute test for x seconds
  -p      Pause for SIGUSR1 before starting
  -P x    Pause for x seconds between iterations
  -t      Turn on syscall timing
  -C ARG  Run the child process with arguments ARG (for internal use)
  -m x    size of malloc in MB (default from /proc/meminfo)
  -r      random touching versus linear
  -v      verbose progress indication
```

Useful options for support are –v and –r. The –v flag executes the test in verbose mode. The –r flag forces random memory touching. This test returns 0 on success and 1 on failure. All failures are reported with a FAIL message.

```
# mem01
Free Mem:        35 Mb
Free Swap:       0 Mb
Total Free:      35 Mb
Total Tested:    35 Mb
mem01        0   INFO   :  touching 35MB of malloc'ed memory (linear)
mem01        1   PASS   :  malloc - alloc of 35MB succeeded

# mem01 -r -v
Free Mem:        35 Mb
Free Swap:       0 Mb
Total Free:      35 Mb
Total Tested:    35 Mb
mem01        0   INFO   :  touching 35MB of malloc'ed memory (random)
.....................................................................................
.....................................................................................
.....................................................................................
.....................................................................................
.............................
mem01        1   PASS   :  malloc - alloc of 35MB succeeded
```

mem02

The `mem02` allocates a 4 MB chunk of memory and verifies that the memory: can be properly zeroed, can be written to, and can be freed. `Mem02` catches memory subsystem errors. The `mem02` test cannot check memory that is currently in use by the system and user space applications. The `mem02` test has no options.

The test returns 0 on success and 1 on any error. All failures are reported with a FAIL message.

```
# mem02
mem02        1   PASS   :  calloc - calloc of 4MB of memory succeeded
mem02        2   PASS   :  malloc - malloc of 4MB of memory succeeded
mem02        3   PASS   :  realloc - realloc of 256MB succeeded
mem02        4   PASS   :  realloc - realloc of 256MB succeeded
```

CPU Error Daemon

In order for the errors to be reported, `syslogd` and `klogd` must both be running. The following error types are monitored:

Table 3-2 CPU Error Types

Exception	Description
Mod	TLB modification exception

Table 3-2 CPU Error Types (Continued)

Exception	Description
TLBL	TLB exception (load or instruction fetch)
TLBS	TLB exception (store)
AdEL	Address error exception (load or instruction fetch)
AdES	Address error exception (store)
Sys	Syscall exception
BP	Breakpoint exception
RI	Reserved instruction exception
CpU	Coprocessor Unusable exception
Ov	Arithmetic Overflow exception
Tr	Trap exception

NOTE Many of these exceptions can be caused by code errors. Before replacing a CPU, verify that the programs running on the system are not known to have defects. Running known “good test programs” to verify the errors is recommended.

All errors are logged in this format:

<Date> <hostname> <alert level> <logging daemon> CPUERR:<type>(Process ID, Program Counter, Address)

A Mod exception will be reported as:

```
Jan  1 00:10:17 demo syslog.alert klogd: CPUERR:Mod(PID=71, PC=0x400700,
BadVaddr=0x2aaa8000)
```

Ethernet Switch Blade Functional Specifications

Ethernet Switch Blade Diagnostics Features

There are no executable diagnostics for the ethernet switch blade. The following components are verified as functional as a result of booting the ethernet switch blade to its Linux based operating environment:

- The IPMC controller passed a power-on self test and established communications across at least one IPMB to the ShMM
- The IPMC controller reported to the ShMM that its power circuits and temperature sensor were within thresholds. (FRU is declared healthy.)
- The ShMM granted permission to the IPMC controller to power on the switch
- The ShMM and the IPMC granted permission to the Ethernet port to access the backplane (if the port is routed to the backplane)
- The onboard CPU is functional, including interrupts
- The Boot flash is operational (bootloader code has run)
- A light-weight, fast memory inspection was conducted during boot
- The Linux kernel was booted from the specified flash device, validating that flash. (The switch administrator can select the boot device by specifying the device on a `zbootcfg` command, if the alternate boot flash needs to be tested)
- The PCI bus was probed to build a list of all devices before the driver module was loaded. The driver attaches only those devices that have an expected PCI device ID.
- The driver makes PCI accesses to get the version information and set up the switch registers and memory
- The Driver reads the VPD (Vital Product Data) over the I^2C bus.
- The Linux (OpenArchitect) driver has loaded successfully and traffic can flow over a given switch port.

The ethernet switch blade LEDs and the shelf manager (ShMM) information related to the switch can assist in troubleshooting hardware failures on the switch. They also can be used to troubleshoot networking problems and network configuration issues.

HP bc2100 ATCA Server Blade Functional Specifications

HP bc2100 ATCA Server Blade Diagnostics Features

The diagnostics are based on the Intel® Modular Test Architecture (Intel® MTA) for Linux*, an execution environment and framework for Intel® architecture (IA) platforms running on a Linux Service OS. This framework consists of test executives and test modules written as Linux applications. The test executives use a text configuration file to describe the tests available and use either a Graphical User Interface (GUI) or command line arguments to specify test options. The test modules use a standard test services library to receive test parameters from the test executive and report status and test results in a consistent manner.

The diagnostics run locally on the Server Blade in an offline mode on a Linux Service OS. The board is instructed to reboot into the Service OS and the diagnostics are loaded and run. The diagnostics interrogate the board and compare the results to known valid values that are configured in a test package. If the tests find variances between the board test results and the test package, the diagnostic test fails. The diagnostics come with default test packages, but need to be reconfigured to represent the final configuration of the board.

Once the diagnostics are complete, the results are captured for viewing in output files. Tests are provided for the following server blade components:

- BMC
- CPU
- Memory
- Cache
- Disk
- USB
- PCI
- System Management BIOS information
- Network Interface Card (NIC)

Refer to the user interface and syntax section for more information on running the tests.

Server Blade Diagnostics Performance

The time required to complete each diagnostic test will vary depending on the blade configuration. In general, most of the individual tests should run to completion (from several seconds to up to one minute). However, memory, cache and disk tests can take much longer, depending on the size of the memory, cache or disk being tested.

See individual test descriptions in the module help files provided with the Service OS diagnostic test package for expected performance of each subtest in a standard configuration.

Server Blade Diagnostics Security

Access to the diagnostic service OS is restricted by user login and passwords, which can be altered within the provided ISO image by the system administrator.

Server Blade Diagnostics Valid Configurations

The diagnostic service OS is delivered in the form of an ISO image. The following are the recommended options for deploying the ISO image:

PXE Boot

The ISO image is downloaded onto the PXE server and the compressed kernel and RAMdisk image (vmlinuz and initrd.gz) are extracted into the tftpboot directory. The diagnostics package is integrated with the Service OS. Once the blade is booted into the Service OS, the BDP package is accessible via a network user session (telnet or ssh).

Information and examples on setting up a PXE server are available at the following web site:

http://syslinux.zytor.com/pxe.php

Booting from CD with BDP ISO image

Create a boot CD using the ISO image of the BDP. Then connect a USB CD-ROM drive to the blade to boot from the CD.

Configuring BIOS Settings for Remote Boot

To correctly boot the Server Blade for diagnostics using the remote boot method, the BIOS settings may need to be changed to select the correct default device to boot from.

NOTE The example below shows how to change the BIOS settings to enable booting of the Diagnostics OS via PXE. Please consult the Server Blade user manual for details of these BIOS settings.

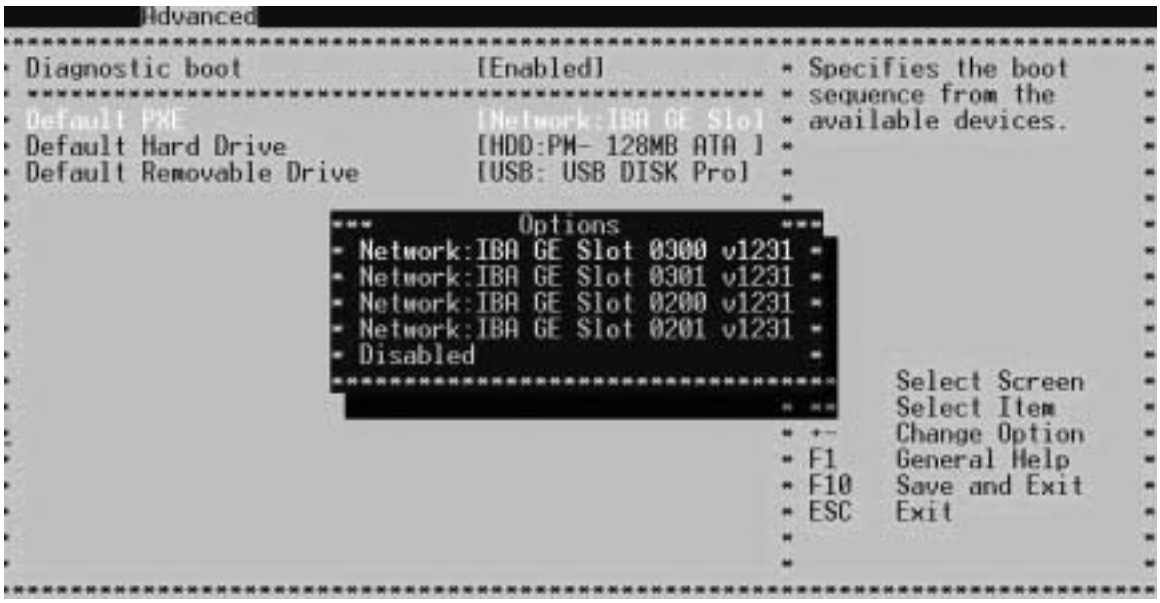
To configure the BIOS settings for remote boot perform the following steps:

1. Make sure that the Diagnostics Boot option is enabled under Advanced Settings (Diagnostic Boot Sequence Configuration Screen). Refer to Figure 3-1.

2. Choose the correct default device for the selected boot option. Available options for the Default PXE device will be based on which ports were enabled for PXE in the PCI configuration screen. The user may select a specific PXE-enabled port to be used for diagnostic boot based on their support configuration. Refer to Figure 3-2.

Figure 3-1 Diagnostics Boot Option

Figure 3-2 Default Device Selection for Diagnostics Boot



Selecting the Diagnostic Boot Sequence

When the default device(s) to be used for diagnostic boot have been configured, the Server Blade will respond to IPMI requests to set the system boot options and boot from one of the configured diagnostic boot devices. The following table summarizes the IPMI commands to invoke the one-time diagnostic boot sequence.

Table 3-3 IPMI Commands for Diagnostic Boot

Command	Net Function	Cmd Code	Request Data
Set System Boot Option	Chassis (00h)	08h	Byte 1 = 0x5 - Parameter Selector as 'boot flags' Byte 2 [7] = 1b - boot flags valid [6] = 0b - options apply to next boot only [5] = 0b - BIOS boot type (for BIOS variants that support both legacy and EFI boots) [4-0] 0b Byte 3 [7] = 0b [6] = 0b [5:2] - Boot device selector 0001b = Force PXE 0010b = Force boot from default hard drive 0101b = Force boot from default CD/DVD [1] = 0b [0] = 0b Byte 4 = 0b Byte 5 = 0b Byte 6 = 0b
Chassis Control	Chassis	02h	Byte 1 =2 - Power cycle =3 - Hard reset

See "Using ipmitool to Request Diagnostic Boot" on page 190 for examples on using the ipmitool utility to perform a diagnostic boot.

Service OS Configuration Information

User logins and passwords

The Service OS is a Linux distribution specifically created for running the diagnostics utility. It includes some of the standard UNIX tools like `grep, less, and vi.`

There are two default users in the Service OS, “root” and “bdp”. It is recommended to use “bdp” as the user when running the diagnostics and other operations. The following are the default passwords for these users:. Refer to “Customizing the Service OS ISO Image” on page 192 for information on customizing the Service OS.

Table 3-4 Default User Logins

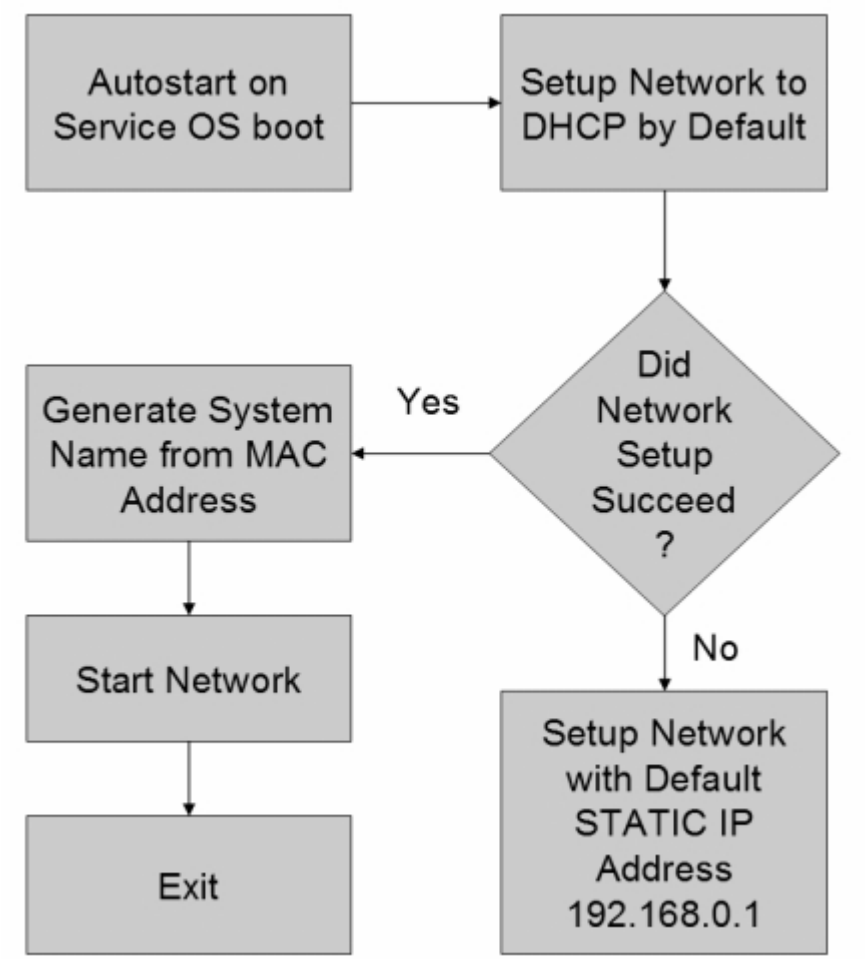
Username	Default Password
root	(none)
bdp	“bdp”

Network configuration

A network configuration agent script, named the netsvc script (`/etc/rc.d/init.d/netsvc`), starts at Service OS boot time. By default, it configures the Service OS network to DHCP. The script can be changed by the user to configure STATIC by default with a specific IP address. The ISO image in this case needs to be rebuilt by the user. Refer to “Customizing the Service OS ISO Image” on page 192 for more information on customizing the service OS.

The script modifies the `ifcfg` file for the base interface. The system name can be generated from the system hardware address (that is, the MAC address can be read by running `ifconfig` and reading the output). By default, the host name is set to bdp-XX-XX-XX-XX-XX-XX, where XX-XX-XX-XX-XX-XX denotes the MAC address of the “eth0” Ethernet interface. Figure 3-3 shows the operation of the network configuration agent.

Figure 3-3 Network Configuration Agent Operation



The script can be changed to use the default STATIC IP address.

HP bc2100 ATCA Server Blade User Interface

HP bc2100 ATCA Server Blade Diagnostics Interface Description

The diagnostics package (referred to as the “Board Diagnostics Package (BDP)” from this point forward) is provided as an ISO image. The ISO image is a bootable CD image that can be installed in the production environment to boot using various boot methods.

The BDP consists of following components:

- Service OS - The Service OS provides basic functionality and an environment for running the offline diagnostics. The Service OS also provides network services for using ssh and telnet interfaces for remote use.
- BDP CLI Application - This is a command line application to invoke the Modular Test Architecture (MTA) that can be run from an interactive login, a remote login or a system manager. Various command line options are available to run diagnostics for selected components or all components.
- Diagnostics Utility - This is the core of the BDP that consists of the binaries, drivers and configuration files required to run the diagnostic tests. The MTA is based on Intel® Modular Test Architecture (Intel® MTA), a framework that provides modules for testing different hardware components such as the CPU, PCI bus, USB, Memory etc.

When run outside of the BDP CLI application, the diagnostics are accessible via a command-line “T” test exec controller module, or via an “XTC” X-Windows test controller

HP bc2100 ATCA Server Blade Diagnostics Overview

The basic organization of the Server Blade diagnostics package is as follows:

- Module executable files (`lxCPU, lxMemory, lxPCI, lxdiskdrv` and so on) in the installed test directory. The test directory (`/opt/intel/bdp/common/iMTA-1.5)` will be initialized on boot with links to the module executables in `/opt/intel/bdp/common/bin/`.
- Module default configuration or “snippet” files (`lxCPU.snp, lxMemory.snp,` and so on) which define all available tests and default execution parameters for the corresponding module. These are text-readable and editable XML files. The test directory (`/opt/intel/bdp/common/iMTA-1.5`) will be initialized on boot with links to the snippet files in `/opt/intel/bdp/common/Configuration/`.
- Test package (.pkg) files created by the user which import one or more of the module snippet files. The .pkg files are also text-readable and editable XML files. The test directory (`/opt/intel/bdp/common/iMTA-1.5`) will be initialized on boot with links to a default BDP package for the board under test (for example from `/opt/intel/bdp/MPCBL0030/Configuration/bdp_MPCBL0030.pkg`).

HP bc2100 ATCA Server Blade Diagnostics Syntax and Semantics of UI

BDP CLI

The BDP Command Line Interface (CLI) can be accessed by logging into the Service OS using telnet or ssh. To run the diagnostics, use "bdp" as the user name (default password "bdp").

CLI Usage

This section describes the various command line options available in the BDP CLI utility.

The BDP executable can be run or invoked remotely from the system manager or locally on the Service OS, with several options. The options enable user to:

- Perform diagnostics on a selected module.
- Output the test results to the screen or to a file at a specified location.
- Halt on error.
- Execute for a given period of time.
- Execute a specific number of times.

The syntax of the BDP executable is as follows:

```
bdp [-c <configuration>]
    [--he ]
    [-n <repeat number>]
    [--rr <File name >]
    [--rv <File name>]
    [--re <File name >]
    [-v]
    [--help]
```

The options are described in Table 3-5.

Table 3-5 BDP Command Options

Option	Description
-e <configuration>	Default <configuration> = core Numeric values can also be used: core =0 The numeric values for these configurations are mapped and listed in the platform.ini file. Refer to Customizing BDP for additional information on creating configurations.
-he	Halt on error

Table 3-5 BDP Command Options (Continued)

Option	Description
-n <repeat number>	Specifies the number of times the test will be repeated. If 0 run forever. The default is 1.
-o <filename>	Redirect all output to the specified file.
-rv <filename>	Redirect verbose output to the specified files.
-re <filename>	Redirect error messages to the specified file.
-v	Display BDP and MTA version number.
-help or -?	Show a brief help message.

NOTE The -o and -rv options turn on verbose mode which can generate large amounts of data very quickly and fill up the available disk space.

Please note the following regarding the use of the BDP CLI:

- Output file names cannot be MTA framework keywords.
- Output file names should be a fully qualified pathname. If a fully qualified pathname is not specified, output files will be created in the test directory /opt/intel/bdp/common/iMTA-1.5.
- When looping with output redirected to the files, the resulting files can grow excessively large, especially when verbose mode is enabled. This can lead to problems with the RAM file system (/dev/ram0), which has limited free space for creating new files.
- The configurations present in the .pkg file are supplied as examples only. Any differences in Server Blade hardware configuration when compared to the configuration when the .pkg file was generated will cause tests to fail. For example, if a .pkg file was generated for a blade with 1 GB of memory installed and the user's blade now has 2 GB installed, some memory tests will fail because of the mismatch in the amount of memory present

BDP CLI Examples

Run default (core) test modules in the default configuration redirecting output to a file and halting on error:

```
# bdp -o /root/alltests.log --he
```

Run default (core) test modules in the default configuration 15 times, redirecting all output to a file:

```
# bdp -o /root/alltests.log -n 15
```

Customizing BDP

The default BDP configuration is named core. Users may modify this configuration and create additional configurations as needed. Each configuration is assigned a numeric equivalent value. This name to number mapping is stored in the /opt/intel/bdp/MPCBLXXXX/Configuration/bdp_MPCBLXXXX.ini file, where MPCBLXXXX is the Server Blade model number. The dual Xeon Server Blade model number is MPCBL0030.

To add a new configuration mapping to the system, add an entry with a unique number to the MPCBLXXXX.ini file. The maximum configuration number is 254. For example, to add the new configuration "preferred" to the system, add following line to the MPCBLXXXX.ini file:

`[n]:preferred`

Where n is the configuration number.

NOTE You must create a new configuration "preferred" as described below for this new configuration to work properly.

The BDP application uses `/opt/intel/bdp/MPCBLXXXX/Configuration/bdp_MPCBLXXXX.pkg` to load the configuration data. The configurations are listed by name in this file.

Editing of the configuration file is performed with the XTC X-windows application found on the blade server. To use the XTC application, boot the Server Blade to the Service OS, login using telnet or ssh. Set the DISPLAY environment variable to the X server you are using as a display. Then run:

```
# export DISPLAY=<your X server DISPLAY>
# cd /opt/intel/bdp/common/iMTA-1.5/
# ./xtc
```

The XTC window will open on your X server. Open the `/opt/intel/bdp/MPCBLXXXX/Configuration/bdp_MPCBLXXXX.pkg` package file and add or edit configurations as required. Refer to "Prerequisite to Using the XTC Program" on page 156 for additional information on using the XTC GUI interface to configure tests.

After the `bdp_MPCBLXXXX.ini` and `bdp__MPCBLXXXX.pkg` files have been modified, copy the modified files into the Service OS ISO Image. Refer to "Customizing the Service OS ISO Image" on page 192 for additional information.

To see the currently available preconfigured tests that can be invoked via the bdp CLI, list the contents of the `/opt/intel/bdp/common/iMTA-1.5/bdp_MPCBLXXXX.ini` file after booting into the diagnostic OS on the blade under test.

"t" Command Line Interface

The BDP interface is the recommended method to invoke MTA. However, there is an iMTA utility that may be used as a stand-alone utility (without the BDP interface) for advanced options. Bypassing the BDP interface will limit the interface capabilities provided by the BDP interface.

The iMTA utility has two user interfaces. This section describes the "t" Command Line Interface (CLI). The next section, "XTC Graphical User Interface" describes the Graphical User Interface (GUI).

NOTE The autoconfigure feature of iMTA scans all the hardware in the Server Blade. It is recommended to populate the board with all hardware before running "t" to create or modify configurations.

The "t" program is located in the `/opt/intel/bdp/common/iMTA-1.5/` directory. The following sections describe how to use the "t" command line interface.

"t" Quick Start

NOTE If you are having problems viewing "t" command output, use the `-BG white` option for a white terminal background or the `-BG black` option for a black terminal background.

- Import all module configuration files (.snp extension) into a new package file (default name: "`t.pkg`").

  ```
  ./t -autoi
  ```

- To import only one module configuration file, type the name of the file after the "autoi" option:

  ```
  ./t -autoi lxCPU.snp
  ```

- To save data to a different package file, use the "`-pkg`" option:

  ```
  ./t -autoi -pkg new_pkg_file_name
  ```

NOTE If a different package file name is used, all following commands must include the `-pkg new_pkg_file_name` option.

- Autoconfigure the package file for the current system (substitute "new_config_name" with your own configuration name).

  ```
  ./t -auto new_config_name
  ```

NOTE 1. Tests will run immediately after they are configured. All destructive tests are disabled.

2. Message colors can be configured for either a black or white background. If messages are hard to read or do not display on the screen, type "`-bg black`" or "`-bg white`" after any commands. The selected color configuration is saved and used for all future commands.

- To re-run the same configuration:

  ```
  ./t -pc new_config_name
  ```

- To save all messages to a file:

  ```
  ./t -pc new_config_name -rr new_file_name.txt
  ```

- To list all tests in the default section of a package file:

  ```
  ./t -dt
  ```

- To list the pre-configured options in the package file:

  ```
  ./t -dt -pc
  ```

"t" Commands and Parameters

Command line syntax for the 't' command is:

```
t [runlist] [flags...]
```

NOTE The "t" command line interface fails if the user supplies one of its keywords (in any case variation) as a file name for any kind of output redirection.

NOTE If the current directory is not included in the "PATH" environment variable, replace all "t" references with "./t". The test directory for the Service OS is `/opt/intel/bdp/common/iMTA-1.5/`

Both `runlist` and `flags` are optional. If "t" is run with no command line arguments, all enabled tests are executed in the order they appear in the module definition list.

Below are examples of valid run lists, assuming the test configuration (which can be displayed with "`t -dt`"):

Table 1-6 show the tests available to be run with the 't' command.

Table 3-6 Available Modules

	2	device - memory
G--E	3	test - Memory Sliding Ones and Zeroes
G--E	4	test - Memory Random Data
G--E	5	test - Memory Address Pattern
	6	device - CPU
G--E	7	test - Clock Speed
G--E	8	test - MMX instructions
	9	device - Drive
G--E	10	test - Physical Disk Sequential Read
G--E	11	test - Physical Disk Sequential WRC

The above output shows tests and flow/groups. The first column has four characters which can be interpreted as follows:

For a test:

- Type (G = Generic, U = Utility). Default = G.
- Interactive (I = Interactive, otherwise "-"). Default = "-".
- Destructive (D = Destrive, otherwise "-"). Default = "-".
- Disabled (D = Disabled, E = Enabled). Default = E.

For a flow/group:

- Type (S = Serial, P = Parallel, E = Parallel Exact). Default = S.
- OnError (C = Continue, H = Halt, P = Pause, T = Trigger). Default = C.
- Loop (F = Forever, T = Time, N = Number). Default = N.
- Depends on value of the third character (Loop);

  If "F", prints "*"

  If "T", lists the number of minutes

  If "N", lists the number of loops

Otherwise lists "-".

The second column shows the test, flow or group number that can be used on the command line.

The third column shows the name of a test, flow or group.

The following are some examples of running "t" (assuming a `t.pkg` file exists from previous steps):

Table 3-7 t Command Examples

Command Line	Description
`t`	Run all test in main section of package file.
`t 2`	Run all test of "memory" device in package file.
`t memory`	Run all tests of "memory" device in package files.
`t 3`	Run test 1 of "memory device in package file.
`t memory.Memory Sliding Ones and Zeroes`	Run test 1 of "memory" device in package file.

Valid "t" flags are given in Table 3-7. Unrecognized flags are passed to the tests in addition to the common and specific command line arguments found in the module definition file.

NOTE "Any valid string" is defined as including alphanumeric characters, dashes (-), underscores (_), brackets ([,]), and spaces.

NOTE Flags are case insensitive. The flags can be used with a preceding dash (-), double dash (--) or slash (/). For example, -auto, --auto, /auto and /AUTO all give the same result.

Table 3-8 t Command Line Interface Flags

Flag	Range	Description
`/AUTO [configname]`	Any valid string	Run each test in self-sense mode to determine the hardware configuration of the system. Write a new configuration override section into the test package file. If the configuration name is not entered, the user is prompted for it. If the configuration name already exists, the existing configuration is overwritten.

Table 3-8 t Command Line Interface Flags (Continued)

Flag	Range	Description
/AUTOI [snp_file]	Valid SNP file name in current directory	Imports SNP file(s) into the package file. If it is used with the PKG flag, it imports files into the specified PKG file. Otherwise, it uses the default PKG file. If the file already exists, the user is given the option to override the current file or append to it. If the SNP file name is specified, it imports only that file. Otherwise, it imports all files with a ".SNP" extension in the current directory.
/BG color	"BLACK" or "WHITE"	Sets message colors to appear correctly, based on the indicated background color. Color choices remain until the /BG flag is used again. The default color is "BLACK".
/DLL dll_name [cmd_line_switches]	Valid DLL name. A user may enter arguments after the DLL name by separating them with commas (no spaces between commas).	Dynamically loads all available functions from the extension library (*dll_name*). It is typically used for data collection in a manufacturing environment. Examples: /DLL libcb.so.1[a,b,c,d] or /DLL libcb.so.1
/DT [line_count]	1 to 2^30	Display all available tests. If a number is specified, up to that many lines of text can be displayed on the screen at one time.
/FLOW [flowname]	Any valid string. It must match the name of the FLOW section in the package file.	Whether running tests or displaying a list of tests, refer to the indicated "flowname" section of the package file.
/HE	None	Halt on error.
/HELP [line_count]	1 to 2^30	Display the help file. If a parameter is specified, that number of lines is displayed on the screen at a time.
/MINUTES number	1 to 2^31 (unsigned long)	Loop on the specified test(s) until the number of specified minutes has elapsed.
/N [number]	0 to 2^31 (unsigned long)	Number of loops. The default is 1. 0 = forever.
/OVER	N/A	Use this flag to run a disabled test.

Table 3-8 t Command Line Interface Flags (Continued)

Flag	Range	Description
/PC [configname]	Any valid string. It must match the configuration name in the package file.	Whether running tests or displaying a list of tests, it refers to the indicated “configname” section of the package file.
/PKG filename	Any valid Linux filename	Use the specified file name as the test package file. The default is “T.PKG”.
/PORT port	1024 to 65535	This switch specifies the port to use for communication between the Test Executive and Run Engine.
/Q	None	Suppress most output to screen. This flag does not suppress Info and Prompt messages, since they are always intended to be viewed.
/QQ	None	Suppress all output to screen, including Info and Prompt messages.
/RA filename	Any valid Linux filename	Redirect advisory messages to a file as well as being displayed on the screen.
/RE filename	Any valid Linux filename	Redirect errors to a file as well as being displayed on the screen.
/RI filename	Any valid Linux filename	Redirect info messages to a file as well as being displayed on the screen.
/RP filename	Any valid Linux filename	Redirect prompt messages and user responses to a file as well as being displayed on the screen.
/RR filename	Any valid Linux filename	Redirect all output to a file as well as being displayed on the screen.
/RS filename	Any valid Linux filename	Redirect status to a file as well as being displayed on the screen.
/RT filename	Any valid Linux filename	Redirect statistic messages to a file (not displayed on screen).
/RV filename	Any valid Linux filename	Redirect verbose messages to a file as well as being displayed on the screen.
/SELF	None	Self sense the hardware and run tests. Similar to the /AUTO flag, but does not save the result in a configuration override section of the package file.
/SF [filename]	Any valid Linux filename	Generate a summary file of tests executed. The default file name is “summary.txt”. If the summary file name is specified, the name cannot be the same as any file names used with redirect file flags (RA, RE, RI, RR, RS, RT, and RV).

Table 3-8 t Command Line Interface Flags (Continued)

Flag	Range	Description
/V [maskvalue]	32-bit integer. Can be negative.	`Maskvalue` is a 32-bit value that is bitwise ANDed with the VerboseMask parameter of any Verbose Test Library function calls the tests make. If the result is non-zero for a particular call, the calls message is displayed. The default `maskvalue` is zero. This flag is intended for module debugging purposes only. A test developer can assign message types to each bit and use them to control tracing of test logic flow. A `maskvalue` of –1 displays all verbose messages in all tests.
/W	None	Do not wait for replies to user prompts. Default values are used instead. Intended for automated scripting.

t Test Results

The results of an invocation of the Test Executive are reported in several ways. As each test is invoked, a line is written to the screen at the beginning and end of each test. Test results are also stored cumulatively in a summary file which has the default name of `summary.txt`. The file name can be changed with the `/SF` command line argument. In addition, for each invocation of the Test Executive, a volatile environment variable records the results of the invocation.

t Screen Output

The format of the screen output as each test is invoked is as follows:

```
MM-DD-YYYY HH:MM:SS [handle] STARTED modulename.testname
MM-DD-YYYY HH:MM:SS [handle] PASSED modulename.testname
MM-DD-YYYY HH:MM:SS [handle] FAILED modulename.testname
```

Text is displayed in the following colors by default:

- “Test Start” messages are reported in white text.
- “Test Passed” messages are reported in green text.
- “Test Failed” messages are reported in red text.
- Error messages are reported in red text.
- Advisory messages are reported in cyan text.
- User prompts are displayed in yellow text.
- Status messages are displayed in gray text.
- Information messages are displayed in white text.
- Verbose messages are displayed in magenta text.

Color values can be changed by using the “`/BG`” flag or manually editing the hidden `.mta` file in the same directory as the “t” Test Executive.

t Summary File

The summary file (by default called `summary.txt`) is a text file that records the cumulative test results for all invocations of the Test Executive. In the file, there is a line for each test that summarizes the number of passes, failures, and errors that each test has reported. The format of the file is as follows:

```
---Module.Subtest--------------------Pass Fail Errors Last Updated:
Modulename.testname                   #####  #####  #####     MM-DD-YYYY HH:MM:SS
```

NOTE The summary file is cumulative across Test Executive invocations, so to reset the counters, the file must be deleted.

Environment Variable Return Code

The environment variable `MTA_RETURN_CODE` is set to "0" if all the tests are successful, and a non-zero value if any tests report a failure. The value is also available in the `$?` environment variable.

Tests and Subtest Descriptions

Descriptions and information on the available tests can be found in the module help (`*_hlp.text`) files in the Service OS. A subdirectory "module help files" will be installed in the test directory (`/opt/intel/bdp/common/iMTA-1.5`) with a help text file for each test module. Please refer to the installed help files for the updated descriptions of the available tests.

XTC Graphical User Interface

The BDP interface is the recommended method to invoke MTA. There is also an iMTA utility that can be used as a stand-alone utility (without the BDP interface) for advanced options. Bypassing the BDP interface may limit the additional interface capabilities provided by the BDP interface.

The iMTA utility has two user interfaces. This chapter describes XTC, which is a Graphical User Interface (GUI). The previous chapter, ""t" Command Line Interface" describes the "t" interface, which is a Command Line Interface (CLI).

The XTC GUI requires a working X server on the client machine.

NOTE The autoconfigure feature of iMTA scans all the hardware present on the Server Blade. Therefore, it is recommended to populate the board with all standard hardware configuration before running the XTC program (or the "t" program) to create or modify configurations.

Prerequisite to Using the XTC Program

To use the XTC (X-windows Test Control) GUI program, it is necessary to have X server running on your client machine. Any X server that supports the X11R6 protocol should be sufficient. Examples of X servers are the standard X-server on Linux/UNIX desktops and workstations. Examples of X-servers running on Windows clients are Hummingbird or Cygwin-X.

The following is an example of how to start XTC from an X-server desktop:

1. Boot the Server Blade into the Service OS. Write down the host name or IP address of the Server Blade. Also write down the X-server's IP address
2. Start a new "xterm" window on your X-server.

3. Add the Server Blade host to the X-server's access control list.

   ```
   $ xhost +[IP ADDRESS OF Server  Blade]
   ```

4. Use telnet or ssh to login to the Server Blade. The default user name is "bdp"; the default password is "bdp".

5. Once logged into the Server Blade, set the DISPLAY environment variable:

   ```
   -bash-3.0# export DISPLAY=[IP ADDRESS OF X-SERVER]
   ```

6. Now, change directory to iMTA-1.5 and start the XTC program:

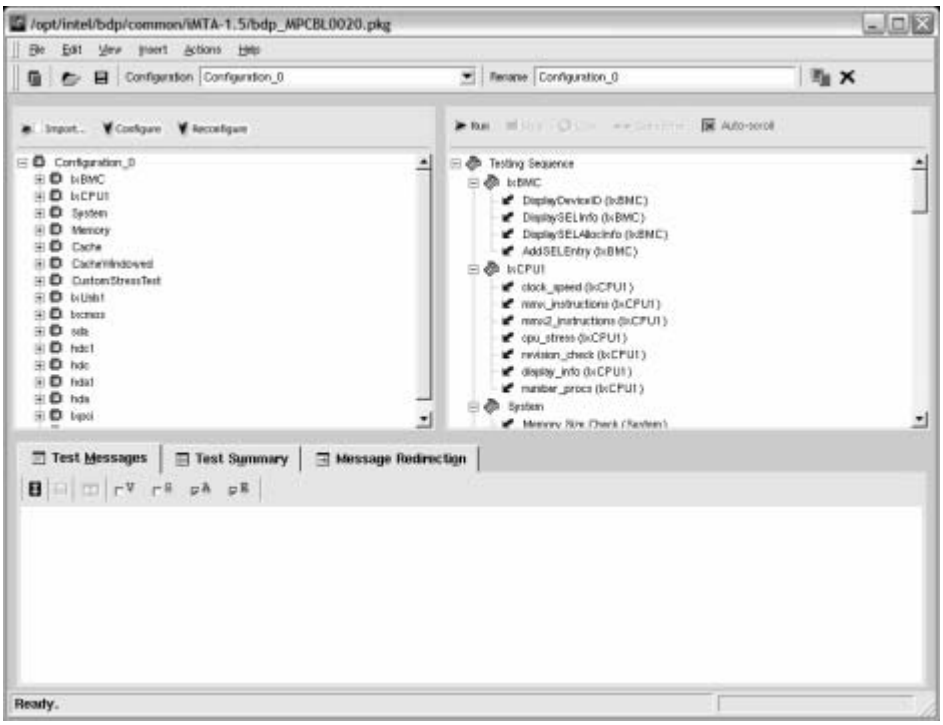
   ```
   -bash-3.0# cd /opt/intel/bdp/iMTA-1.5
   -bash-3.0# ./xtc
   ```

The following sections describe how to use the XTC program to import modules and to configure, copy, add, and modify packages to create different test configurations. The XTC program is the recommended method for creating package configurations because it offers more options than the "t" program command line utility, and it offers a user-friendly interface.

Getting Started

After the XTC program starts, a "Welcome to X-Windows Test Control (XTC)!" message is displayed. The window shown in Figure 3-4 is then displayed.

Figure 3-4 XTC Program Environment



Additional information on XTC and its features is described in the sections:

- Overivew
- Basic Concepts
- Document File Types

Overview

XTC is short for “X-Windows Test Control” and is the graphical user interface for the Intel® Modular Test Architecture for Linux. XTC tests are organized into modules to accommodate the wide range of system configurations available. A group of test modules configured for a system is called a test package. The overall architecture was designed to make it easy to configure because it is possible to update an existing test package to accommodate new hardware by simply adding a new module.

Basic Concepts

This section describes all of the basic components of a test package and the overall concepts of XTC

which include:

- Test Package
- Autoconfig Template
- Module
- Device
- Test
- Parameter
- Test Flow Groups
- Test Flow Tree
- Configuration Tree
- Message Types
- Summary File

Test Package

A test package is a collection of configurations. The first configuration tree in a package is called the “template configuration”. This tree is used during the auto-configuration process to generate new configuration trees.

A configuration consists of a configuration tree and a flow tree. A configuration tree consists of devices, and devices consist of individual subtests. The flow tree consists of flow groups and subtests. The subtests within the flow tree are only pointers into the corresponding configuration tree. The flow tree is where a user can control the duration and sequence of subtests.

Autoconfig Template

The template configuration serves a unique purpose. It is used as a template for the autoconfig process. This means that autoconfig will invoke the autoconfig subtest of each device in the template. The output from the autoconfig subtests is used to build a new configuration.

When the memory autoconfig subtest is running, it is probing the current system's memory configuration and reporting back to the test executive with information such as the type of memory and how much memory to expect.

By default, an empty package has an empty “Autoconfig Template”. Use the `import` command to add devices into the template configuration. Devices in the template configuration may not be run because they are in an “unconfigured” state.

Module

A module is a collection of devices that target a subsystem, hardware device or a class of devices.

For example, a module called lxCPU might have a number of tests that target the CPU as opposed to memory or chip sets. The definition is a little vague because some modules may have multiple devices which target different hardware functions. An example of this would be the lxMemory module that exercises memory, cache and symmetric multi-processing.

A module is a collection of files:

- `lxModule` - The executable file containing the test code.
- `lxModule.hlp` - A help file describing all the tests, parameters and error messages.
- lxModule`.snp` - A configuration tree branch representing the tests and parameters.
- `*.so.*` - Any required libraries.

The name of the module in the configuration tree does not have to be the same as the file name.

Device

Tests within modules are logically grouped by devices.

Shortcut: Double-click the left mouse button on a device to edit its parameters.

Test

A test is the smallest executable unit of a module that returns a pass or a fail result. A module represents an executable file. When the executable file is run, a parameter is passed to it to select the desired test by test number.

A test is represented by a node in the configuration tree and a test's properties may be viewed and edited by the test Property Sheet (see the section "Property Dialog Boxes").

Shortcut: Double-click the left mouse button on a test to edit its parameters.

Parameter

A parameter is an input to the test and usually describes variable characteristics of hardware, such as the size of memory. Parameters can also be used to control the test in other ways, such as representing a testing pattern or a number of bytes to test.

A parameter has a name and a value. Parameters may be optional or required. Parameters may be numeric or string valued. The only way to know these things is to have read the modules help file.

Parameters are inherited and overridable. Tests are passed all parameters in all of its parent groups. If a parameter occurs more than once, only the parameter located lowest in the tree is passed.

Shortcut: Double-click the left mouse button on a parameter to edit its parameters.

Test Flow Groups

Flow Groups are used to specify how a group of tests will be executed. The icons for flow groups represent serial and parallel test flows. The flow type and a number of other parameters (such as number of loops and time limit) can be specified and changed using the group Property Sheet (Refer to "Property Dialog Boxes" on page 167t).

Shortcut: Double-click the left mouse button on a flow group to edit its parameters.

Test Flow Tree

A Test Flow tree is a hierarchy of flow groups that control the order of test execution. The flow groups contain tests (or other flow groups) and specify how the tests are run. The groups specify whether the tests are run in parallel or serial, run forever, halt on error, etc.

To add a test to the flow tree, drag it from the configuration tree and drop it in the desired group.

Configuration Tree

A configuration tree is a collection of tests and parameters that have been adjusted for a specific hardware configuration. Packages can contain any number of configurations.

Message Types

Various message types can be sent from test modules. Each message type can be individually filtered from the message window. Each type can also be redirected to a separate file.

The following are the supported message descriptions and corresponding color code:

- Error messages are sent when a failure condition is detected by the test or the test executive. If this message is sent, the test will indicate a failure in the test status window.
- Informative messages generated by tests with names like “Display CPU”.
- Advisory messages are sent to indicate conditions that a user should be aware of during testing, but are not failures. For example, the test executive could display an advisory if a test is sending keep-alive messages at intervals close to the test timeout period. This would indicate that the test is running slowly, which may be due to running too many tests in parallel.
- Status messages are sent to indicate progress through the test.
- Prompt messages log the message and answer after a user-interactive dialog box is displayed by a test.
- Statistic messages include a piece of data you may want to collect in the data collection system, such as the exact value of an analog measurement.
- Verbose messages are debug messages and usually only make sense to the module developer.

Summary File

The summary file displays the test’s full path, the last known state, the activity and the progress values. The pass and fail count are recorded also.

The summary file is updated once per second during testing. The default file name is “`xtc_summary.csv`”, but you can change the name with the `/SUMMARY` invocation parameter. There is also a place to change the file name in the options window.

The output file is comma-separated for convenience when importing the file into a spreadsheet program. The following is a sample extract from the summary file:

```
Test,State,Pass,Fail,Activity,Progress

Memory Size Check pkgname/configuration_0/flowname/system, idle, 1, 0, 7, 100%
```

Document File Types

XTC supports the following file types:

- XML Package File (.PKG) - XML representation of a Test Package.
- XML Snippet File (.SNP) - XML representation for a branch of a Configuration Tree that supports a Module.

This extension designates a branch of a Configuration Tree. It contains no test flow data. This type can be opened directly from the File menu by choosing Open. Snippet files are imported into package files.

User Interface

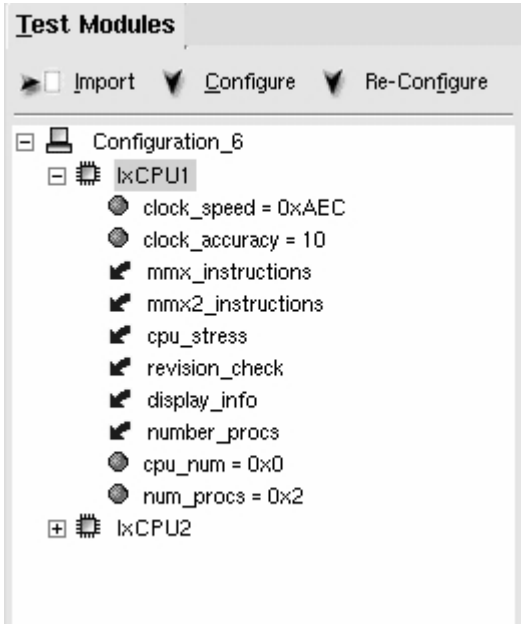
The User Interface consists of the following major components.

- Test Modules Pane.
- Test Sequence Pane.
- Message Redirection Pane.
- Test Message Pane.
- Test Summary Pane.
- Property Dialog Boxes.
- Menus and Toolbars.
- Status Bar.
- Right-Click Menu.

Test Modules Pane

The Test Modules pane, shown in Figure 3-5, holds a configuration's supported tests.

Figure 3-5 Test Modules Pane



The buttons on the test modules pane are described in Table 3-9.

Table 3-9 Test Modules Pane Button Descriptions

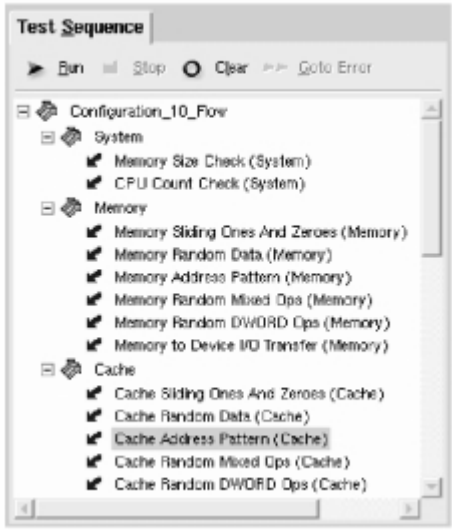
	Import devices from snippet files into the template configuration's configuration tree.

Table 3-9 Test Modules Pane Button Descriptions (Continued)

Configure	Run autoconfigure on all devices in the template configuration, and create a new configuration. If there is a flow in the template configuration, the flow is copied to the new configuration.
Re-Configure	Run autoconfigure on all devices in the current configuration, and create a new configuration. If there is a flow in the current configuration, the flow will be will be copied to the new configuration.

Test Sequence Pane The Test Sequence pane shown in Figure 3-6 holds the flow tree.

Figure 3-6 Test Sequence Pane



The buttons on the test sequence pane are described in Table 3-10.

Table 3-10 Test Sequence Pane Button Descriptions

Run	Start the top of the flow tree.
Stop	Stop all test execution.
Clear	Clear the test message and summary window.

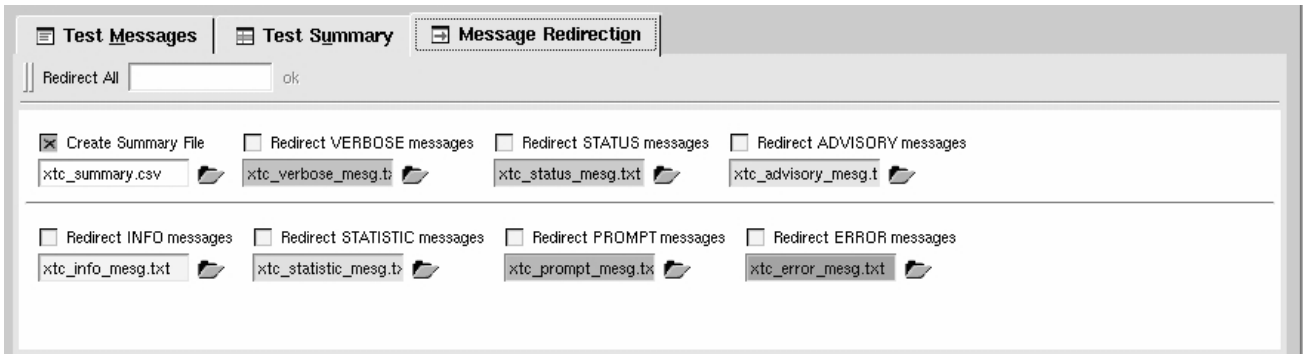
Table 3-10 Test Sequence Pane Button Descriptions (Continued)

Goto Err	Jump to the next failing test node in the flow tree. This is handy for large flows that are collapsed. This button expands all nodes leading to the first failing test. If the flow has multiple failing nodes, clicking it again jumps to the next failed node.

Message Redirection Pane

The Message Redirection pane, shown in Figure 3-7, provides the ability to redirect specific message types into different files. These options do not affect how messages are displayed in the Test Message pane (see the following section).

Figure 3-7 Message Redirection Pane



Test Message Pane

The Test Message pane, shown in Figure 3-8, displays messages of different types.

Figure 3-8 Test Message Pane

The buttons on the test message pane are described in Table 3-11.

Table 3-11 Test Message Pane Button Descriptions

	Expand this window vertically. Restores back to the original height if pressed again.
	Save all of the current messages into a file.
	Search dialog box.
	Verbose mask dialog box.
	Turn status messages on or off.

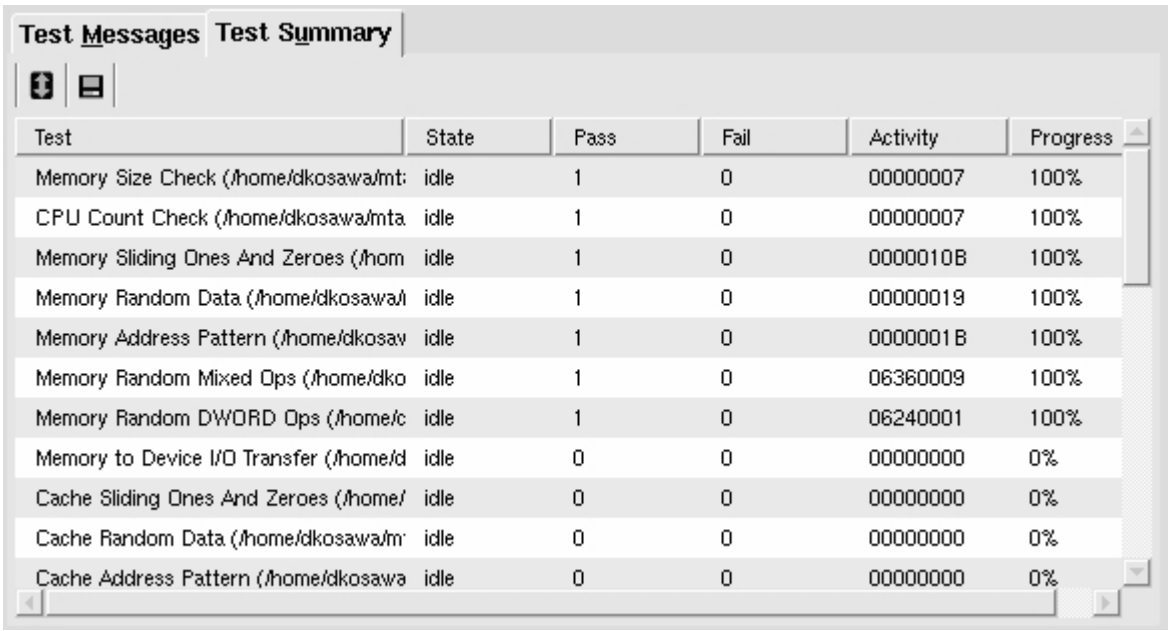
Table 3-11 Test Message Pane Button Descriptions (Continued)

	Turn advisory messages on or off.
	Turn error messages on or off.

NOTE Turning status, advisory, and error messages off does not affect message redirection to a file. Turning verbose messages off does affect message redirection.

Test Summary Pane The Test Summary pane, shown in Figure 3-9, shows the status of the various tests.

Figure 3-9 Test Summary Pane



The buttons on the test summary pane are described in Table 3-12.

Table 3-12 Test Summary Pane Button Descriptions

Test	The test name and path
State	idle = test is not running starreg = test is running aborted = test is being aborted

Table 3-12 Test Summary Pane Button Descriptions (Continued)

Pass	The number of times the test passed
Fail	The number of times the test failed.
Activity	The first word is the number of test library calls made. The second word is for the module developer's use.
Progress	How far along the test is.

Property Dialog Boxes

Double-click a node to pop up a "property" dialog box. Depending on the type of file editing, PKG or SNP, some fields may not be editable. The following are examples of the different nodes and their property dialog boxes.

Device Node Dialog Box

Double-click  to display the device node dialog.

Figure 3-10 Device Node

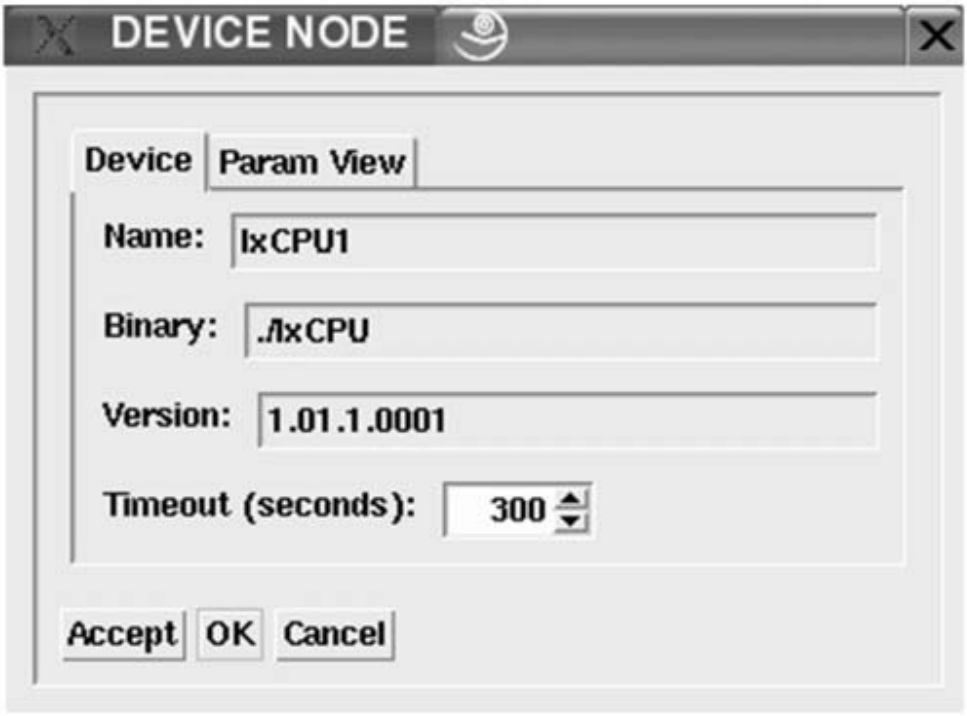


Table 3-13 describes the fields for the device node dialog.

Table 3-13 Device Node Field Descriptions

Name	This field is the name of the device. Device names are not editable from a package file.
Binary	This field is the name of the binary. The binary name and the device name do not have to match.
Version	This is the version string from the module's binary.
Timeout	This is the timeout value in seconds. If the module is not active for this many seconds the test executive will terminate the process.

NOTE The "Accept" button applies the new settings, but does not remove the dialog box. Once a property dialog box is open, clicking on other nodes once automatically updates the open box.

Test Node Dialog Box

Double-click to display the test node dialog.

Figure 3-11 Test Node Dialog

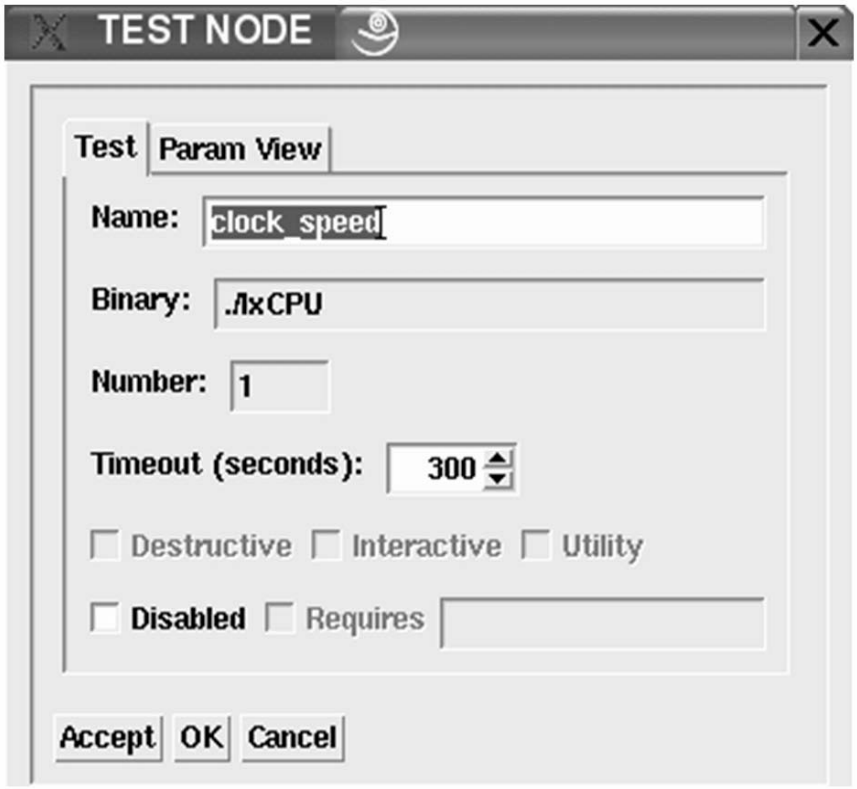


Table 3-14 describes the fields for the test node dialog.

Table 3-14 Test Node Field Descriptions.

Field	Description
Name	The test name. Test names are editable from a package file.
Binary	The binary name of the module in which the subtest belongs.
Number	The subtest number.
Timeout	This timeout overrides the device's timeout.
Destructive	The test does not put the component testing back in the original state.
Interactive	The test requires some user input, unless the /w flag was used to invoke XTC.
Utility	Typically means the test does not report an error if something is wrong.

Table 3-14 Test Node Field Descriptions. (Continued)

Field	Description
Disabled	The test will not run. By default, destructive tests should be disabled.
Requires	The test requires external hardware or special setup before it can run.

Flowgroup Node Dialog Box

Double-click  or  to display the Flowgroup node dialog.

Figure 3-12 Flowgroup Node Dialog

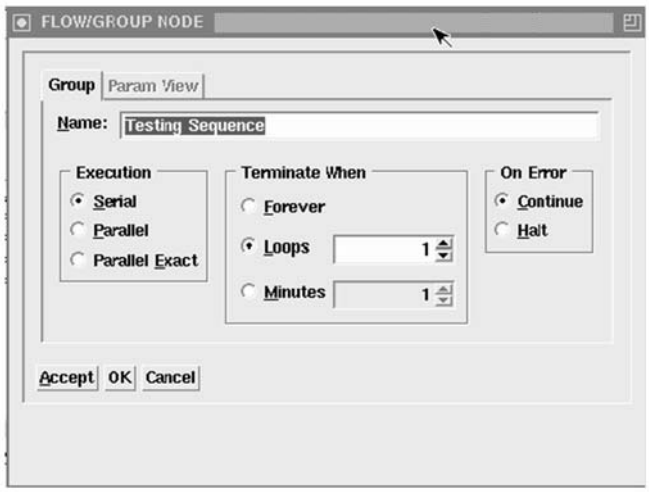


Table 3-15 describes the fields for the flowgroup node dialog box.

Table 3-15 Flowgroup Node Field Descriptions

Field	Description
Name	This field is the name of the binary. The binary name and the device name do not have to match.
Execution	Execution: See the section “Test Flow Groups” for more information.
Terminated	When to terminate test: Forever: The test runs until manually aborted. Loops: The test runs N times. Minutes: The test runs for N minutes.

Table 3-15 Flowgroup Node Field Descriptions (Continued)

Field	Description
On Error	Action to take on error: Continue: Errors do not interrupt test flow. Halt: All tests are aborted on 1st error.

Param Node Dialog Box

Double-click  to display the param node dialog.

Figure 3-13 Param Node Dialog

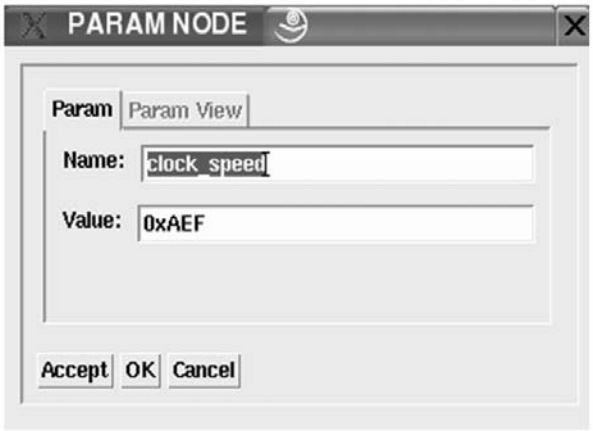


Table 3-16 describes the fields in the param node dialog box.

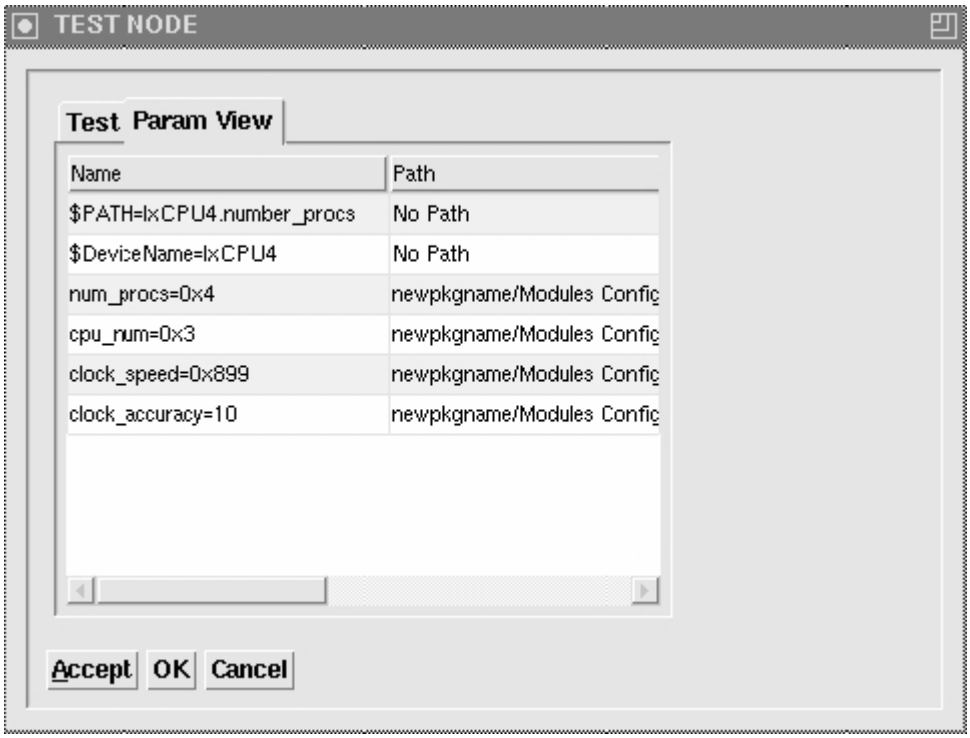
Table 3-16 Param Node Field Descriptions

Field	Description
Name	The name of the parameter.
Value	The parameter value.

Param View Tab

Double-click and click the Param View tab to view the parameters that a test is using.

Figure 3-14 Param View Tab



The **Param View** tab provides the list of the parameters that a particular test receives, and also shows where each parameter resides in the package file.

Menus and Toolbars

The main menu and toolbar are shown in FIG HERE.

Figure 3-15 Main Menu and Toolbar

The main menu and toolbar contain the following menus and buttons:

- File Menu
- Edit Menu
- View Menu
- Insert Menu
- Action Menu
- Help Menu
- New Pkg Button
- Open File Button
- Save File Button
- Configuration Drop Down
- Configuration Rename
- Clone Configuration
- Remove Configuration

Additional information on each menu and toolbar is found in the following sections.

File Menu

Table 3-17 describes the file menu.

Table 3-17 File Menu

Menu Command	Shortcuts		Description
New Package	Alt-F Alt-N Alt-P	Ctl-N	Creates a new package (.pkg) file.
New Snippet	Alt-F Alt-N Alt-S		Creates a new snippet (.snp) file.
Open	Alt-F Alt-O	Ctl-O	Opens an existing package or snippet file.

Table 3-17 File Menu (Continued)

Menu Command	Shortcuts		Description
Save	Alt-F Alt-S	Ctl-S	Saves the current package file. If the package file has not been previously named, the Save As dialog box is displayed.
Save As	Alt-F Alt-A	Ctl-A	Saves the current package file as a different name.
Exit	Alt-F Alt-E	Ctl-E	Exits the application if tests are not running. If the user chooses “Exit” while tests are running, the “Tests are still running. Stop tests before exiting” message is displayed and the application does not exit. The “Run” icon in the Test pane changes to the “Stop” icon that the user must click to stop the tests.

Edit Menu

Table 3-18 describes the edit menu.

Table 3-18 Edit Menu

Menu Command	Shortcuts		Description
Undo	Alt-E Alt-U	Ctl-Z	If there is an “undo” action in the action log, the last action is undone. Actions such as running tests, switching configurations, running autoconfigure, and saving the package file erase the action log.
Cut	Alt-E Alt-T	Ctl-X	If there is an “undo” action in the undone log, the last undone action is redone. Actions such as running tests, switching configurations, running autoconfigure, and saving the package file erase the undone log.
Cut	Alt-E Alt-T	Ctl-X	Removes the node currently in focus from the tree and saves the node for later pasting. Root nodes of the configuration and flow tree may not be cut.
Copy	Alt-E Alt-C	Ctl-C	Copies the node currently in focus from the tree and saves the node for later pasting. Copying and pasting may not be done with a flow node as the source, and the configuration tree as the destination. Copying across configurations is also prohibited for all node types.
Paste	Alt-E Alt-P	Ctl-V	Pastes the node from the copy buffer into the desired location.
Node Properties	Alt-E Alt-O	Ctl- Shift-P	Pops up the Properties dialog box for the in-focus node, excluding the root of the configuration tree. Editing properties of the root of the configuration tree is done through the options pane.
PKG Properties	Alt-E Alt-E		Pops up a box displaying the package version number.

View Menu

Table 3-19 describes the contents of the view menu.

Table 3-19 View Menu

Menu Command	Shortcuts	Description
Status	Alt-V Alt-M Alt-S	Toggles the status messages on/off in the Test Messages pane. This does not affect status redirection to a file.
Advisory	Alt-V Alt-M Alt-A	Toggles the advisory messages on/off in the Test Messages pane. This does not affect advisory redirection to a file.
Error	Alt-V Alt-M Alt-E	Toggles the error messages on/off in the Test Messages pane. This does not affect error redirection to a file.
Verbose	Alt-V Alt-M Alt-V	Displays a verbose mask dialog box. A value of 0 turns off all verbose messages in the Test Message pane. A value of 0xFFFFFFFF or -1 turns on all verbose messages. This does affect verbose redirection to a file.
Show Active	Alt-V Alt-S	With show active set, the Test Summary window only displays tests that are currently running. Otherwise, all test nodes in the execution branch are displayed. Tests that are not currently running display an “idle” state. Tests that are running show a “started” state. Tests that have been aborted show an “aborted” state. Updates to the Test Summary table take place only when a test starts. Therefore, toggling during runtime does not take affect until the next test starts.
Tree Stats	Alt-V Alt-T	Turns test statistics in the test node “on” or “off” while tests are running. This setting may only be changed while the tests are not running.

Insert Menu

Table 3-20 describes the contents of the insert menu.

Table 3-20 Insert Menu

Menu Command	Shortcuts		Description
Add Device	Alt-I Alt-D	Ctl-D	Adds a device node to the root of the configuration tree (Test Modules Window) when editing a snippet file. You must explicitly open a file with the .snp extension, or create a new snippet file to enable this feature
Add Test	Alt-I Alt-T	Ctl-T	Adds a test node to the root of a device node in the configuration tree (Test Modules Window) when editing a snippet file. You must explicitly open a file with the .snp extension, or create a new snippet file to enable this feature.
Add Param	Alt-I Alt-P	Ctl-P	Adds a test node to the root of a device node in the configuration tree (Test Modules Window) when editing both a snippet file and a package file. You may add parameters to both the .snp and .pkg files.
Add Group	Alt-I Alt-T	Ctl-T	Adds a group node to the flow tree (Test Sequence Window) when editing a package file. You must explicitly open a file with the .pkg extension, or create a new package file to enable this feature.

Action Menu

Table 3-21 describes the contents of the action menu.

Table 3-21 Action Menu

Menu Command	Shortcuts		Description
Run Flow	Alt-A Alt-R	F5	Starts the test flow (Test Sequence Window).
Stop Tests	Alt-A Alt-S	F6	Stops all test execution.
Clear Results	Alt-A Alt-C	F7	Clears the Test Summary and Test Messages windows, and resets the flow tree back to its original state.
Goto Error	Alt-A Alt-E		Expands all branches that lead to the failing node, and makes the node visible within the window. If there is more than one error, activating this feature again jumps to the next failed node. This is convenient when you have a very large flow tree that is collapsed.
Configure Tests	Alt-A Alt-G	F8	Runs auto-configure on all device nodes in the Template Configuration's configuration tree (Test Modules Window). The end result is a new configuration.

Table 3-21 Action Menu (Continued)

Menu Command	Shortcuts		Description
Import Tests	Alt-A Alt-I	F9	Imports one or more snippet files into the current package file. The end result is one or more new device nodes under the Template Configuration's configuration tree.
Switch Configuration	Alt-A Alt-W	Ctl-W	Moves focus to the configuration drop-down list in the Options pane. In that pane, you can switch to a different configuration within the current package file.
Clone Configuration	Alt-A Alt-N		Makes a copy of the current configuration, and gives it a unique name.
Run This	Alt-A Alt-U	Ctl-U	Runs the node currently in focus in either tree.
Redirect Messages	Alt-A Alt-E		Moves focus to the 'Redirect Verbose Messages' check box in the Options pane.
Summary File	Alt-A Alt-M		Moves focus to the 'Create Summary File' check box in the Options pane. The summary file is updated every second, and is given the name defined in the adjacent text field.

Help Menu

Table 3-22 describes the contents of the help menu.

Table 3-22 Help Menu

Menu Command	Shortcuts	Description
About	Alt-H Alt-A	Pops up a dialog box describing the version number, and licensing information.
Overview	Alt-H Alt-O	Pops up a brief overview file on XTC.
Startup Wizard	Alt-H Alt-S	Enables or disables the startup wizard.
Configuration Wizard	Alt-H Alt-C	Enables or disables the configuration wizard. The configuration wizard occurs when a package file that contains multiple configurations is opened

New Package Button

 This button creates a new package file.

Open File Button

 This button opens an existing package (.pkg) or snippet (.snp) file.

Save File Button

 This button saves the current package or snippet file. If the file has not been previously saved the Save As dialog box is displayed.

Configuration Drop-Down

This drop-down list allows you to navigate between configurations within the package file.

Configuration Rename

This text box allows you to rename the current configuration.

Clone Configuration

 This button creates an exact copy of the current configuration within the current package fileThis text box allows you to rename the current configuration.

Clone Configuration

 This button removes the current configuration from the package file.

Status Bar

The status bar shows an elapsed timer.

Right-Click Menu

Right clicking on a node in the tree displays the menu shown in Figure 3-16. This menu provides shortcuts to some of the main menu commands. Additional information is found in the Menu and Toolbar sections above.

mer.

Figure 3-16 Right-Click Menu

Invocation Parameters

These parameters can be entered on the command line invocation of XTC to control various aspects of XTC. The forward slash token may be replaced by a hyphen.

Example - The following commands both invoke autoconfigure:

```
xtc /auto
xtc –auto
```

NOTE Flags are case insensitive. The flags can be used with a preceding dash (-) or double-dash (--) slash (/). For example, -auto, /auto, --auto, and /AUTO all yield the same result.

The complete list of parameters is as follows:

- `file.pkg` - Initial document file opened by XTC.
- `/PKG` - Same as the above.
- `/AUTO` - Run autoconfig first.
- `/SELF` - Run autoconfig first, but do not save pkg file.
- `/RUN` - Run tests without user input.
- `/CFG` - Use specified configuration tree on startup
- `/PC` - Same as `/CFG` above.
- `/MINUTES` - Stop testing after number of minutes.
- `/LOOPS` - Stop testing after number of loops.
- `/N` - Same as `/LOOPS` above.
- `/QUIT` - Exit XTC when tests complete.
- `/HE` - Set top flow node to Halt on error.
- `/FOREVER` - Set top flow node to run-forever.

- /SUMMARY - Write summary file to specified file name
- /SF - Same as /SUMMARY above.
- /V - Control verbose messaging.
- /PORT - Specify the socket for executive communications.
- /Q - Quit mode. Turns off most messages to screen.
- /L - Loud mode. Forces error, status, and advisory on.
- /W - Turns off interactive tests.
- Message Redirection parameters - Redirect selected message types to a file.

file.pkg

The first parameter on the command line, not preceded by a slash (/), is the initial file to be opened when the application starts. This file may be one of the two supported types: .PKG and .SNP.

/PKG

Command Line: /PKG filename

The filename parameter is required when using this switch. This switch is provided for backwards compatibility purposes.

/AUTO

Command Line: /AUTO configtree

This switch causes autoconfig to be run when XTC starts.

If the optional configtree parameter is specified, a new configuration tree is added to the package. The new tree contains the results of autoconfig. If the configtree parameter is not specified, a unique name is assigned to the configuration.

If this switch is used in combination with the /RUN switch, autoconfig always occurs before tests are run.

/SELF

Command Line: /SELF configtree

This switch causes autoconfig to be run when XTC starts.

If the optional configtree parameter is specified, a new configuration tree is added to the package. The new tree contains the results of autoconfig. If the configtree parameter is not specified, a unique name is assigned to the configuration.

If this switch is used in combination with the /RUN switch, autoconfig always occurs before tests are run.

NOTE This switch differs from the /AUTO switch because it does not save the package file when autoconfigure is complete.

/RUN

Command Line: /RUN

This switch causes XTC to run tests when the application starts. The tests run are those in the flow tree of the test package specified on the command line. If the /AUTO switch is used in combination with this switch, autoconfig runs before testing is started.

/CFG

Command Line: /CFG configname

This switch causes XTC to load a specific configuration tree when it starts. This is particularly useful when used with the /RUN command.

The configname parameter must be the name of a configuration tree in the package file.

/PC

This switch has the same effect as the /CFG switch.

/MINUTES

Command Line: /MINUTES number

This switch forces testing to stop after a specified number of minutes.

The number parameter indicates the number of minutes the test should run. The number parameter is required. If the parameter is omitted the command is ignored.

/LOOPS

Command Line: /LOOPS number

This switch forces testing to stop after a specified number of minutes.

The number parameter indicates the number of loops. By default testing stops after one loop.

/N

This switch has the same effect as the /LOOPS switch

/QUIT

Command Line: /QUIT

This switch forces STC to exit after tests have been run. This switch is most commonly use with the /RUN or /AUTO switch.

/HE

Command Line: /HE

This switch forces testing to stop when an error occurs. When tests are stopped, a signal is sent to all running tests. Each test is responsible to check the signal, stop testing, clean up and execute. The amount of time it takes to stop is varies when tests are running in parallel.

/FOREVER

Command Line: `/FOREVER`

This switch determines the name of the summary file as specified by the filename parameter. By default, the name is "`summary.out`".

/SUMMARY

Command Line: /SUMMARY

This switch determines the name of the summary file as specified by the filename parameter. By default the filename is 'summary.out'.

/SF

Command Line: `/SF`

This switch has the same functionality as the `/SUMMARY` switch.

/V

Command Line: `/V mask`

This switch causes verbose (debug) messages from tests to be displayed.

If the optional mask parameter is -1 or 0xFFFFFFFF, all verbose messages are displayed. If the value is 0x1, then only level 1 debug messages are displayed. If the optional mask parameter is not defined, then the default value (-1) is used.

/PORT

Command Line: `/PORT number`

This switch forces executive communication sockets to use the port specified by the number parameter. The number parameter is required.

/Q

Command Line: `/Q`

This switch suppresses most output to screen. It does not suppress "info" and "prompt" messages, because these are intended to be presented to the user at all times.

/L

Command Line: `/L`

This switch forces advisory status and error messages to be displayed in the test message.

/W

Command Line: `/W`

This switch forces interactive tests off. Default values provided by the module are used in place of the users input.

Message Redirection

The following switches can be used to redirect test message types to files. Any combination of the parameters is allowed.

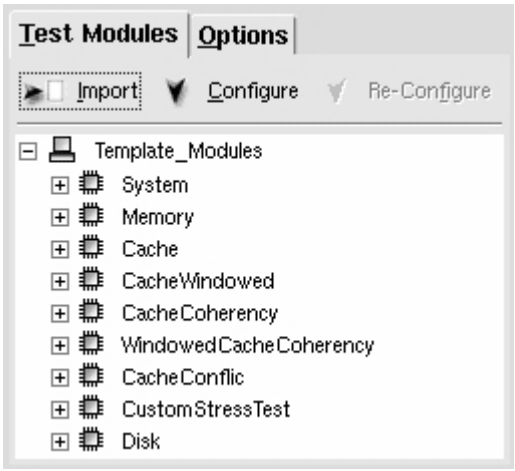
Command Line:.

- `/RE filename` - Redirect errors to filename.
- `/RA filename` - Redirect advisory to filename.
- `/F.RS filename` - Redirect status to filename.
- `/RP filename` - Redirect pause to filename.
- `/RT filename` - Redirect statistics to filename.
- `/RR filename` - Redirect all to filename.

Autoconfigure

Autoconfigure is the act of programmatically capturing a function's (hardware or software) feature set for testing purposes. Autoconfigure runs each module in a mode that sets the module's parameters to pass on the current hardware. Autoconfigure should only be used on known good hardware. See Figure 3-17 for information on starting the autoconfigure process.

Figure 3-17 Starting Autoconfigure

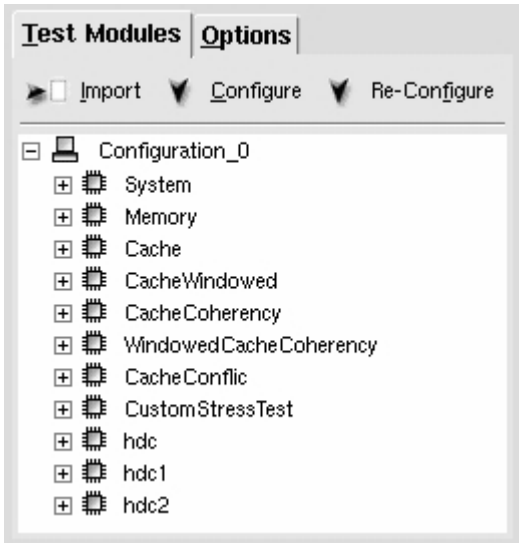


Click "Configure" to start the autoconfigure process.

The 'template configuration' is shown above. These are all of the devices that will run autoconfigure.

When autoconfiguration completes a new configuration is created. See Figure 3-18.

Figure 3-18 Autoconfiguration Complete



A new configuration was created and automatically named "Configuratino_0". The configuration name can be changed in the Options pane.

Autoconfigure configurations tree update options are as follows:

- Autoconfigure Configuration Tree Updates.
- Autoconfigure Flow Tree Updates.

Autoconfigure Configuration Tree Updates

Once autoconfigure is complete you can expect a new configuration with devices in the new configuration tree ready to test the current platform. In order to do this, modules are given the ability to programmatically alter the configuration tree during the autoconfigure process. The following are the supported autoconfigure actions:

- Disabled Tests
- Remove Tests
- Remove Devices
- Clone Devices
- Change Parameter Values
- Add New Parameters

Disabled Tests

In certain situations, a device may need to disable a test. For example, the disk drive module disables all physical write tests because they are destructive. Tests that are disabled can be easily re-enabled by double-clicking the test and clearing the disable check box. Disabled tests are represented by a faded blue icon.

Remove Tests

In certain situations, tests need to be completely removed from the configuration tree because there is no way for the test to possibly run. For example, if the USB module detects the current system does not support USB2.0, it removes all USB2.0-specific tests from the configuration tree.

Remove Devices

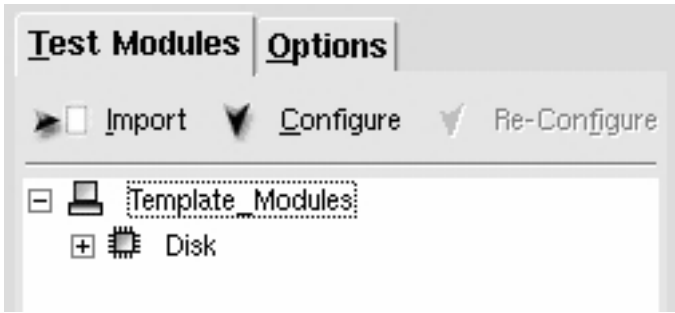
When a module's entire suite of tests are incapable of running, the entire device should be removed. For example, when the USB module detects that a system has no USB controllers, it removes itself completely from the configuration tree.

Clone Devices

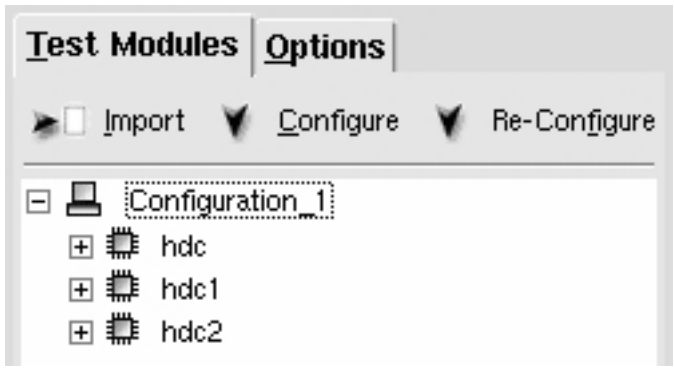
Modules that support an undetermined number of devices (such as hard drives) have the ability to clone and rename itself within the configuration. See Figure 3-19.

Figure 3-19 Cloned Devices Representation

Template Device



After Autoconfigure and Cloning



Change Parameter Values

Devices within the template configuration usually have default parameter values. When a module probes the actual hardware, it usually updates the parameter values to accurately reflect the state of the hardware.

Add New Parameters

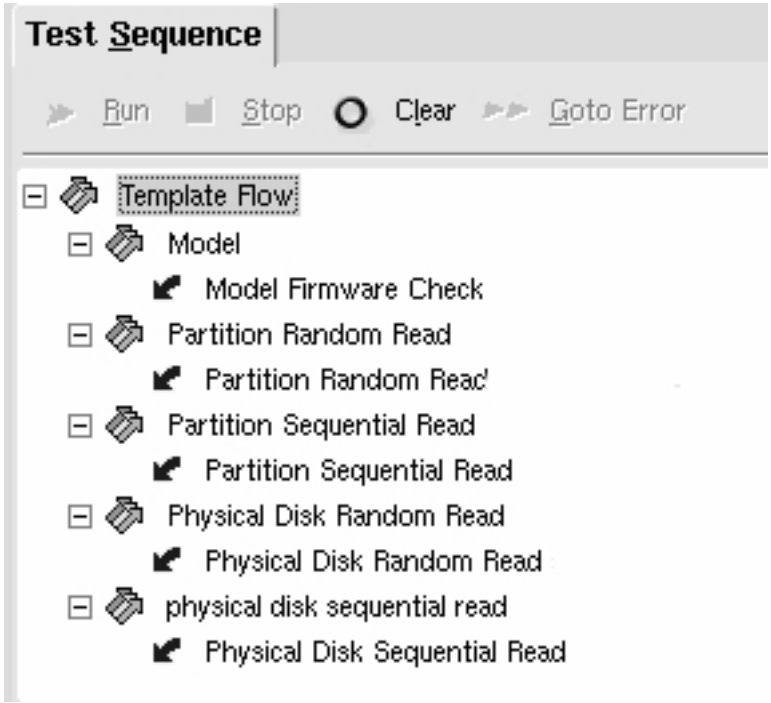
New parameters may also show up in the configuration tree.

Autoconfigure Flow Tree Updates

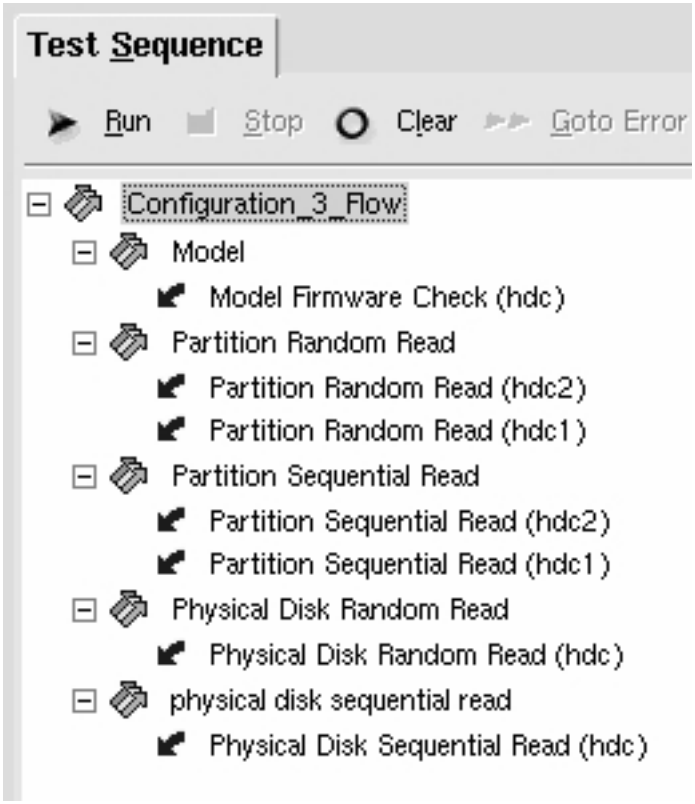
The second tree within a configuration is the flow tree. The flow tree controls test sequencing and duration for a particular configuration. Autoconfigure copies the flow tree from the template configuration into the new configuration, or creates a new serial flow if a template flow is not available. See Figure 3-20 for an example.

Figure 3-20 Autoconfigure Flow Tree Updates

Template Flow



Flow After Autoconfigure



Re-Configure

Re-Configure is useful when you have a configuration with only a subset of the devices from the template configuration tree, or if your configuration's flow tree differs from the template flow.

Autoconfigure runs the autoconfigure process on all devices from the template's configuration tree, and copies the template's flow tree into the new configuration. Re-Configure only runs autoconfigure on the current configuration's devices, and copies the current configuration's flow tree into the newly generated configuration. The ability to autoconfigure a single device within a configuration may be added later.

BIOS Settings

Tests affected by BIOS settings and optionally present hardware are given below.

Table 3-23 BIOS Settings and Description

Test Module	Description
lxBMC	Not affected
lxCPU	Affected by CPU speed settings in the BIOS. Affected by enabling or disabling HyperThreading in the BIOS
lxICHx	Disabled if no Serial Ata Ports autosensed. Affected by the presence or absence of PMCs. (1 on HP bc2100 ATCA Server Blade; common example: Video Card)
lxPCIe	Not affected
lxPCIx	Affected by the presence or absence of PMCs
lxpci	Affected by the presence or absence of PMCs
lxUsb	Affected by disabling USB 2.0 support in the BIOS. Affected by the presence of USB devices connected to the blade's USB port(s); common examples are keyboard, mouse, HUB, Flash JumpDisk, external CD, etc.
lxcmos	Affected by changing CMOS settings after the module has been configured
Disk	Partition checks affected by adding or removing disk partitions after the module is configured. Physical disk checks affected by adding, removing, or replacing hard disk drives.
SMB_Info	Affected by changes to the associated FRU or SDR data. Tests that look at the Product FRU, which should not change. Tests that look at the Board FRU, some of which may change; an example is the Board. FRU's Description field. Tests that look at the Chassis FRU, which change if the blade is installed in a different chassis after the module is configured
Memory Controller Hub	Affected by the type and configuration of memory DIMMs

Table 3-23 BIOS Settings and Description (Continued)

Test Module	Description
System, Memory, Cache, CacheWindowed, CacheCoherency, WindowedCacheCoherency, CacheConflict, and CustomStressTest	Many of these have “memory size” checks, which are affected by adding or removing memory after the module is configured. Many of these also have “CPU count checks”, which are affected by enabling/disabling. HyperThreading in the BIOS after the module is configured
lxL106x	Affected by the presence or absence of external SAS devices
SuperIO	Not affected

Using ipmitool to Request Diagnostic Boot

For accessing the HP bc2100 ATCA Server Blade diagnostic Service OS, it is possible to override the default boot options and boot device priority (configured in the BIOS setup), and instead invoke a diagnostic boot sequence using an IPMI command to set the system boot options. For example, if the Server Blade generally boots from its local hard disk, an IPMI command can be sent to the blade to direct the blade to perform a PXE boot instead on its next boot. This is a one-time only boot option, so subsequent boots will once again be based on the boot device priority in the BIOS.

The IPMI command functionality is described in the IPMI 1.5 Specification in the section on “Remote Access Boot Control” (“Set System Boot Options” command). A summary of the command bytes is shown below

Table 3-24 ipmitool Command Bytes

Command	Net Function	Cmd Code	Request Data
Set System Boot Options	Chassis (00h)	08h	• Byte 1 = 0x5 - Parameter Selector as ‘boot flags’ • Byte 2 [7] = 1b - boot flags valid [6] = 0b - options apply to next boot only [5] = 0b - BIOS boot type (for BIOS variants that support both legacy and EFI boots) • Byte 3 [7] = 0b [6] = 0b [5:2] = Boot device selector - 0001b = Force PXE - 0010b = Force boot from default hard drive - 0101b = Force boot from default CD/DVD • Byte4 = 0b • Byte5 = 0b • Byte6 = 0b

`ipmitool` is a command line utility program that is used to send ipmi commands either locally (if ipmitool is running on the Server Blade’s Linux OS) or via IPMI-over-LAN if run from a remote system manager.

For more information on ipmitool please see: http://ipmitool.sourceforge.net

Example 1: Sending a local raw data request to PXE boot on next boot

```
ipmitool raw 0x00 0x08 0x05 0x80 0x04 0x00 0x00 0x00
```

Where, as shown in the table above:

0x04 - "force PXE" bits 0001b in request data byte 3[5:2]

Example 2: Sending an IPMI-over-LAN request to PXE boot blade in slot 4 on next boot

```
ipmitool  -I lan -H  192.168.1.2 -U root -P rootpass -t 0x8e raw 0x00 0x08 0x05 0x80
0x04 0x00 0x00
```

Where:

"`-I  lan`" specifies the LAN interface should be used by ipmitool

"`-H 192.168.1.2`" is the IP address of the shelf manager through which the RMCP session will be established (a hostname can also be specified instead of IP address, if applicable)

"`-U root -P rootpass`" is the user login information (root/rootpass) for the shelf manager RMCP session

"`-t 0x8e`" is the target IPMB address for the bridged request (8eh is the address for physical slot 4)

Some versions of ipmitool also support command keywords which can be specified instead of the raw hex bytes in some cases. For example:

```
ipmitool chassis bootdev [ pxe | disk | cdrom ]
```

So the following syntax can also be used to send the IPMI-over-LAN request shown in Example 2:

```
ipmitool -I lan -H 192.168.1.2 -U root -P rootpass -t 0x8e chassis bootdev pxe
```

After invoking ipmitool to send the set system boot options request, the specified blade can be rebooted; the one-time only boot option will be in effect. When specifying PXE boot, the appropriate configuration must exist on the PXE server so that the boot request from the MAC address associated with the Server blade's diagnostic boot PXE port will cause the Service OS to be downloaded for diskless boot.

Customizing the Service OS ISO Image

To create a customized Service OS ISO image with customized BDP configurations and any other changes, follow these instructions:

1. Copy the ISO image to a Linux machine.
2. Mount the ISO image using the Loopback interface.

   ```
   # mkdir /mnt/loop
   ```

   ```
   # mount -o loop ReleasedImage.iso /mnt/loop
   ```
3. Copy the entire directory structure of the mounted image to the new location.

   ```
   # cp -a /mnt/loop/* /home/CopiedImageTree
   ```
4. Unmount the ISO image.

   ```
   # umount /mnt/loop
   ```
5. Make changes to the files (add, remove, or edit) in the new location. Most custom-tailoring, such as changing passwords or network configuration options, or adding custom prebuilt test packages, will require changing files in the initrd:

   - Unzip the `initrd`:

     ```
     # gunzip /home/CopiedImageTree/boot/isolinux/initrd.gz
     ```
   - Mount the `initrd` using the loop interface:

     ```
     # mount -o loop /mnt/loop \ /home/CopiedImageTree/boot/isolinux/initrd
     ```
   - Modify files, copy new files (.pkg, ...)

     ```
     # cp /tmp/*.pkg /mnt/loop/opt/intel/bdp/MPC0020/Configuration/
     ```
   - Unmount the `initrd`:

     ```
     # umount /mnt/loop
     ```
   - Rezip the `initrd`:

     ```
     # gzip /home/CopiedImageTree/boot/isolinux/initrd
     ```
6. Use `mkisofs` to create a new ISO image from the new location.

   ```
   # mkisofs -o newimage.iso -b boot/isolinux/isolinux.bin -c \
         boot/isolinux/isolinux.cat \
         -no-emul-boot -boot-load-size 4 -boot-info-table -l -R -r -U \
         ./CopiedImageTree
   ```

4 System Event Log Decoding

This chapter describes how to access and decode events logged in the System Event Log (SEL). For an in-depth discussion of SEL entries see the IPMI v1.5 documentation.

Introduction

This chapter provides information to decode and interpret the System Event Log (SEL).

Accessing the SEL

The System Event Log is accessed through the ShMM `clia` using the `sel` command. The `sel` command needs 2 arguments. The first argument specifies the IPMB address of the component that maintains the SEL (20 in the example). The second argument identifies the number of entries from the end of the SEL to be displayed (5 in the example).

```
# clia sel 20 5


Pigeon Point Shelf Manager Command Line Interpreter


0x0270: Event: at Apr 19 07:24:11 1970; from:(0x8e,0,0); sensor:(0x01,55);
       event:0x1(asserted): "Upper Non-Critical", Threshold: 0x4b, Reading: 0x4b

0x0272: Event: at Apr 19 07:24:35 1970; from:(0x8e,0,0); sensor:(0x01,93);
       event:0x1(asserted): "Upper Non-Critical", Threshold: 0x2d, Reading: 0x2d

0x0273: Event: at Apr 19 07:25:31 1970; from:(0x8e,0,0); sensor:(0x01,55);
       event:0x1(deasserted): "Upper Non-Critical", Threshold: 0x4b, Reading: 0x48

#
```

Decoding an SEL Entry

The general format of an SEL entry is a colon and semicolon delineated set of fields. Entries are read from left to right. The first field is the SEL ID. The SEL ID is a unique value generated by the ‘Event Receiver”. The Event Receiver in the HP bh5700 ATCA 14-Slot Blade Server is the ShMM. Each field contains information as specified in Table 4-1.

System Event Log Record Structure

Table 4-1 presents the format of the SEL Event Records and describes the information that each record field contains.

Table 4-1 Raw SEL Event Record Data

Byte	Field	Description
1 2	Record ID	ID used for SEL Record access. Note: The Record ID values 0000h and FFFFh have special meaning in the Event Access commands and must not be used as Record ID values for slotted SEL Event Records.
3	Record Type	[7:0] - Record Type 02h = system event record C0h - DFh = OEM timestamped, bytes 8-16 OEM defined E0h-FFh = OEM non-timestamped, bytes 4-16 OEM defined

Table 4-1 Raw SEL Event Record Data (Continued)

Byte	Field	Description
4 5 6 7	Timestamp	Time when the event was logged. Least significant byte first.
8 9	Generator ID	RqSA & LUN if the event was generated from the IPMB. Software ID if the event was generated from the system software. Byte 1 [7:1] - 7 bit I^2C. Slave Address or 7-bit system software ID [0] - 0b = ID is IPMB Slave Address [0] - 1b = System Software ID Byte 2 [7:4] = Channel number. Channel that received the event message. 0h if the event message was received via the system interface, primary IPMB or internally generated by the BMC. NOTE: New for IPMI v1.5. These bits were reserved in IPMI v1.0. [3:2] - reserved. Write as 00b. [1:0] - IPMB device LUN if byte 1 holds the Slave Address, otherwise 00b.
10	EvM Rev	Event Message format version (=04h for events in this specification, 03h for IPMI v1.0 Event Messages).
11	Sensor Type	Sensor Type Code for the sensor that generated the event. Use the first column of Table 4-5 to identify the type of sensor that generated the event.
12	Sensor #	Number of the sensor that generated the event. For the `clia sel` command this value is reported in decimal. To identify the correct sensor you must know which component is reporting the event. Use the “Event Generator” row in Table 4-2 to identify the reporting component. Once the component is identified use the “Sensor Num (decimal)” column from the component specific table downloaded from http://www.hp.com/XXXX to identify the sensor.

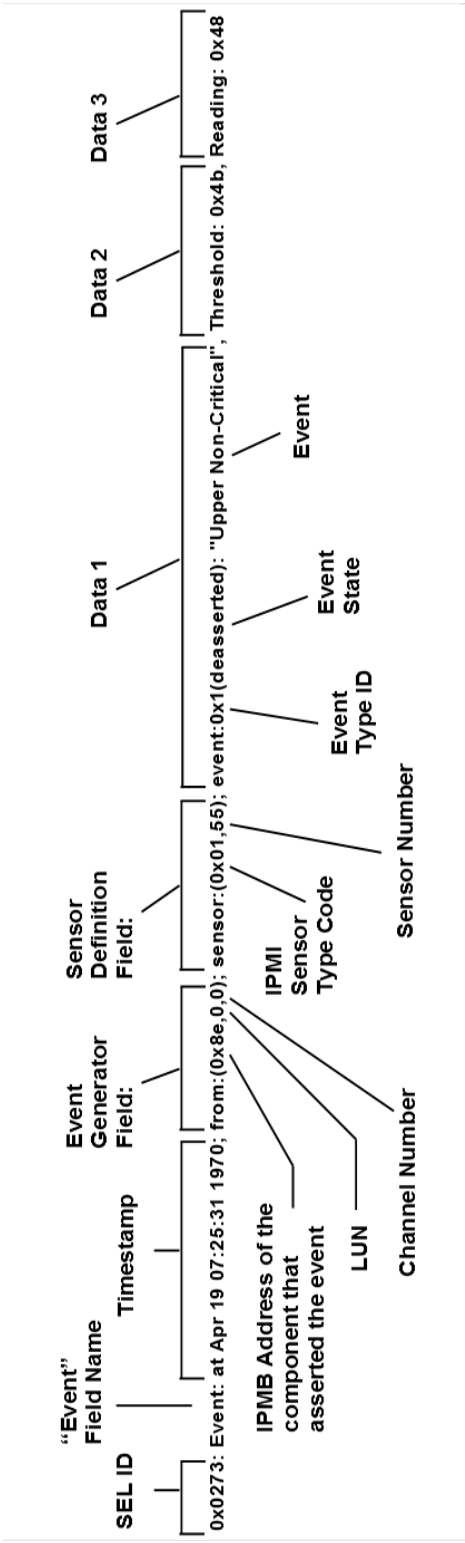
Table 4-1 Raw SEL Event Record Data (Continued)

Byte	Field	Description
13	Event Dir | Event Type	Event Dir [7] - 0b = Assertion event. [7] - 1b = Deassertion event. Event Type Type of trigger for the event, such as a critical threshold going high, a state asserted, etc. It also indicates the class of the event, such as discrete, threshold, or OEM. The Event Type field is encoded using the Event/Reading Type Code. Use Table 4-4 to decode the event type [6:0] - Event Type Code
14	Event Data 1	Use Data 1 column in the table identified in the Generator ID and Sensor # steps above.
15	Event Data 2	Use Data 2 column in the table identified in the Generator ID and Sensor # steps above.
16	Event Data 3	Use Data 3 column in the table identified in the Generator ID and Sensor # steps above.

Example SEL Entry

Figure 4-1 shows an SEL entry with the record fields identified.

Figure 4-1 SEL Entry with Fields Identified



Decoding the Example SEL Entry

Decoding an SEL entry consists of identifying the values of the fields in the event record and using the value tables to decode their meaning.

Table 4-2 shows how to decode and SEL entry. The example uses the SEL entry from Figure 4-1.

Table 4-2 Decoding Example

SEL Field	Value	Decode
SEL ID	0x0273	Unique identifier of this SEL entry.
Timestamp	Apr 19 07:25:31	Date and time of the event.
Event Generator	0x8e,0,0	The Event Generator Field identifies the IPMB address of the board where the event occurred, the LUN on the board and the Channel Number. Table 4-3 identifies the IPMB addresses that map to physical components in the chassis. For this example: 0x8e = Node 4 = Physical Slot 4. To continue you must identify the type of component located in slot 4 of the chassis (A Ethernet Switch Blade or a Server Blade). For this example Slot 4 contains an HP bc2100 ATCA Server Blade. Chassis level components. Non-Slot components such as the ShMM, are identified using the component tables. For example a value of 0x20 identifies the ShMM as the initiating component. Note: For this release the LUN and Channel Numbers will be 0 and require no decoding.

Table 4-2 Decoding Example (Continued)

SEL Field	Value	Decode
Sensor Definition	0x01,55	The Sensor Definition identifies the sensor type and the specific sensor that caused the event. Sensor types are defined in Table 4-5 (Table 4-5 reproduces Table 36-3 from the IPMI v1.5 documentation). Specific sensor information is dependent on the component identified in the Event Generator field. Once the component is identified refer to the component table to identify the specific sensor that asserted the event. For example: 0x01 = Temperature Sensor from Table 4-5 (Table 36-3 in the IPMI v1.5 documentation). 55 = Decimal identifier for the specific sensor that asserted the event. Use the “Sensor Num Dec” column of the component specific decoding table to identify the sensor. For this example use the HP bc2100 ATCA Server Blade table. From this table ‘55’ identifies the sensor as the CPU 0 Temp sensor. Note: See “Component-Specific SEL Decoding Tables” on page 217 for information on downloading the component specific decoding tables.
Event Type ID	0x01(deasserted)	The Event Type ID identifies the specific event that occurred. For example: 0x01 identifies this as a threshold event (refer to Table 4-4 for additional information on event types). ‘deasserted’ identifies that the event was going low. Refer to the Data 1 field for which event crossed the threshold. For this example an “Upper non-critical” event occurred.
Data 1	“Upper non-critical”	Use the component specific table for additional information
Data 2	Threshold: 0x4b	Use the component specific table for additional information
Data 3	Reading: 0x48	Use the component specific table for additional information

IPMB Address to Physical Slot Mapping for SEL Decoding

Table 4-3 is used to map the IPMB address found in the SEL event to the physical slot to identify the blade that caused the SEL event to be recorded.

Table 4-3 IPMB Address to Physical Location Making

IPMB Address	Physical Location		Component	Logical Address
9A	Slot 1		Node 1	13
96	Slot 2		Node 2	11
92	Slot 3		Node 3	9
8E	Slot 4		Node 4	7
8A	Slot 5		Node 5	5
86	Slot 6		Node 6	3
82	Slot 7		Node 7	1
84	Slot 8		Node 8	2
88	Slot 9		Node 9	4
8C	Slot 10		Node 10	6
90	Slot 11		Node 11	8
94	Slot 12		Node 12	10
96	Slot 13		Node 13	12
9C	Slot 14		Node 14	14
10	Left Lower Chassis Slot		ShMM	
12	Right Lower Chassis Slot		ShMM	
20	Active		Virtual ShMM	

Decoding Tables

Table 4-4 Generic Event/Reading Type Codes

Generic Event/Reading Type Code	Event/Reading Class	Generic Offset (Data 1)	Description
			THRESHOLD BASED STATES
01h	Threshold	00h 01h 02h 03h 04h 05h 06h 07h 08h 09h 0Ah 0Bh	Lower Non-critical - going low Lower Non-critical - going high Lower Critical - going low Lower Critical - going high Lower Non-recoverable - going low Lower Non-recoverable - going high Upper Non-critical - going low Upper Non-critical - going high Upper Critical - going low Upper Critical - going high Upper Non-recoverable - going low Upper Non-recoverable - going high
			DMI-based “Usage State” STATES
02h	Discrete	00h 01h 02h	Transition to Idle Transition to Active Transition to Busy
			DIGITAL/DISCRETE EVENT STATES
03h	‘digital’ Discrete	00h 01h	State Deasserted State Asserted
04h	‘digital’ Discrete	00h 01h	Predictive Failure deasserted Predictive Failure asserted
05h	‘digital’ Discrete	00h 01h	Limit Not Exceeded Limit Exceeded
06h	‘digital’ Discrete	00h 01h	Performance Met Performance Lags
			SEVERITY EVENT STATES
07h	Discrete	00h 01h 02h 03h 04h 05h 06h 07h 08h	transition to OK transition to Non-Critical from OK transition to Critical from less severe transition to Non-recoverable from less severe transition to Non-Critical from more severe transition to Critical from Non-recoverable transition to Non-recoverable Monitor Informational

Table 4-4 Generic Event/Reading Type Codes (Continued)

Generic Event/Reading Type Code	Event/Reading Class	Generic Offset (Data 1)	Description
			AVAILABILITY STATUS STATES
08h	'digital' Discrete	00h 01h	Device Removed / Device Absent Device Inserted / Device Present
09h	'digital' Discrete	00h 01h	Device Disabled Device Enabled
0Ah	Discrete	00h 01h 02h 03h 04h 05h 06h 07h 08h	transition to Running transition to In Test transition to Power Off transition to On Line transition to Off Line transition to Off Duty transition to Degraded transition to Power Save Install Error
			Other AVAILABILITY STATUS STATES

Table 4-4 Generic Event/Reading Type Codes (Continued)

Generic Event/Reading Type Code	Event/Reading Class	Generic Offset (Data 1)	Description
0Bh	Discrete		Redundancy States
		00h	Fully Redundant (formerly “Redundancy Regained”) Indicates that full redundancy has been regained.
		01h	Redundancy Lost Entered any non-redundant state, including Non-redundant: Insufficient Resources.
		02h	Redundancy Degraded Redundancy still exists, but at a less than full level. For example: A system has four fans, and can tolerate the failure of two of them, and presently, one has failed.
		03h	Non-redundant: Sufficient Resources from Redundant. Redundancy has been lost but the unit is functioning with minimum resources needed for ‘normal’ operation. Entered from Redundancy Degraded or Fully Redundant.
		04h	Non-redundant: Sufficient Resources from Insufficient Resources Unit has regained minimum resources needed for ‘normal’ operation. Entered from Non-redundant: Insufficient Resources.
		05h	Non-redundant: Insufficient Resources Unit is non-redundant and has insufficient resources to maintain normal operation.
		06h	Redundancy Degraded from Fully Redundant Unit has lost some redundant resource(s) but is still in a redundant state. Entered by a transition from Fully Redundant condition.
		07h	Redundancy Degraded from Non-redundant Unit has regained some resource(s) and is redundant but not fully redundant. Entered from Non-redundant:Sufficient Resources or Non-redundant:Insufficient Resources.

Table 4-4 Generic Event/Reading Type Codes (Continued)

Generic Event/Reading Type Code	Event/Reading Class	Generic Offset (Data 1)	Description
0Ch	Discrete		ACPI Device Power States
		00h	D0 Power State
		01h	D1 Power State
		02h	D2 Power State
		03h	D3 Power State

Sensor Type Codes (Table 36-3 from the IPMI v1.5 Documentation)

Table 4-5 Sensor Type Codes (Table 36-3 from the IPMI v1.5 Document)

Sensor Type	Sensor Type Code	Sensor Specific Offset (Data 1)	Event
reserved	00h	-	Reserved
Temperature	01h	-	Temperature
Voltage	02h	-	Voltage
Current	03h	-	Current
Fan	04h	-	Fan
Physical Security (Chassis Intrusion)	05h	00h 01h 02h 03h 04h 05h 06h	General Chassis Intrusion Drive Bay intrusion I/O Card area intrusion Server area intrusion LAN Leash Lost (the system is unplugged from the LAN) Unauthorized dock/undock FAN area intrusion (supports detection of hot plug fan tampering)
Platform Security Violation Attempt	06h	00h 01h 02h 03h 04h 05h	Secure Mode (Front Panel Lockout) Violation attempt Pre-boot Password Violation - user password Pre-boot Password Violation attempt - setup password Pre-boot Password Violation - network boot password Other pre-boot Password Violation Out-of-band Access Password Violation
Server (Processor)	07h	00h 01h 02h 03h 04h 05h 06h 07h 08h 09h	IERR Thermal Trip FRB1/BIST failure FRB2/Hang in POST failure (used hang is believed to be due or related to a server failure. Use System Firmware Progress sensor for other BIOS hangs.) FRB3/Server Startup/Initialization failure (CPU didn't start) Configuration Error SM BIOS 'Un-correctable CPU-complex Error' Server Presence detected Server disabled Terminator Presence Detected

Table 4-5 Sensor Type Codes (Table 36-3 from the IPMI v1.5 Document)

Sensor Type	Sensor Type Code	Sensor Specific Offset (Data 1)	Event
Power Supply	08h	00h 01h 02h 03h 04h 05h	Presence detected Power Supply Failure detected Predictive Failure Power Supply AC lost AC lost or out-of-range AC out-of-range, but present
Power Unit	09h	00h 01h 02h 03h 04h 05h 06h 07h	Power Off / Power Down Power Cycle 240VA Power Down Interlock Power Down AC lost Soft Power Control Failure (unit did not respond to a request to turn on) Power Unit Failure detected Predictive Failure
Cooling Device	0Ah	-	-
Other Units-based Senor (per units given in SDR)	0Bh	-	-
Memory	0Ch	00h 01h 02h 03h 04h 05h	Correctable ECC / other correctable memory error Uncorrectable ECC / other uncorrectable memory error Parity Memory Scrub Failed (stuck bit) Memory Device Disabled Correctable ECC / other correctable memory error logging limit reached The Event Data 3 field for this command can be used to provide an event extension code, with the following definition: 7:0 DIMM/SIMM/RIMM identification, relative to the entity that the sensor is associated with (if SDR provided for this sensor)
Drive Slot (Bay)	0Dh	-	-

Table 4-5 Sensor Type Codes (Table 36-3 from the IPMI v1.5 Document)

Sensor Type	Sensor Type Code	Sensor Specific Offset (Data 1)	Event
POST Memory Resize	0Eh	-	-
System Firmware Progress (Formerly POST Error)	0Fh	00h	System Firmware Error (POST Error) The Event Data 2 field can be used to provide an event extension code, with the following definition: <u>Event Data 2:</u> 00h Unspecified. 01h No system memory is physically installed in the system. 02h No usable system memory, all installed memory has experienced an unrecoverable failure. 03h Unrecoverable hard-disk/ATAPI/IDE device failure. 04h Unrecoverable system-board failure. 05h Unrecoverable diskette subsystem failure. 06h Unrecoverable hard-disk controller failure. 07h Unrecoverable PS/2 or USB keyboard failure. 08h Removable boot media not found 09h Unrecoverable video controller failure 0Ah No video device detected 0Bh Firmware (BIOS) ROM corruption detected 0Ch CPU voltage mismatch (servers that share same supply have mismatched voltage requirements) 0Dh CPU speed matching failure 0Eh to FFh reserved
		01h	System Firmware Hang (uses the same Event Data 2 definition as following the System Firmware Progress offset)

Table 4-5 Sensor Type Codes (Table 36-3 from the IPMI v1.5 Document)

Sensor Type	Sensor Type Code	Sensor Specific Offset (Data 1)	Event
System Firmware Progress (Formerly POST Error) Continued		02h	System Firmware Progress The Event Data 2 field can be used to provide an event extension code with the following definition: Event Data 2: 00h Unspecified. 01h Memory initialization. 02h Hard-disk initialization 03h Secondary server(s) initialization 04h User authentication 05h User-initiated system setup 06h USB resource configuration 07h PCI resource configuration 08h Option ROM initialization 09h Video initialization 0Ah Cache initialization 0Bh SM Bus initialization 0Ch Keyboard controller initialization 0Dh Embedded controller/management controller initialization 0Eh Docking station attachment 0Fh Enabling docking station 10h Docking station ejection 11h Disabling docking station 12h Calling operating system wake-up vector 13h Starting operating system boot process, e.g. calling Int 14h Baseboard or motherboard initialization 15h reserved 16h Floppy initialization 17h Keyboard test 18h Pointing device test 19h Primary server initialization 1Ah to FFh reserved

Table 4-5 Sensor Type Codes (Table 36-3 from the IPMI v1.5 Document)

Sensor Type	Sensor Type Code	Sensor Specific Offset (Data 1)	Event
Event Logging Disabled	10h	00h	Correctable Memory Error Logging Disabled
		01h	Event 'Type' Logging Disabled. Event Logging is disabled for the following event/reading type and the offset has been disabled. Event Data 2 Event/Reading Type Code Event Data 3 [7:6] - reserved. Write as 00b. [5] 1b = logging has been disabled for all events of a given type [4] 1b = assertion event, 0b = deassertion event [3:0] Event Offset
		02h	Log Area Reset/Cleared
		03h	All Event Logging Disabled
Watchdog 1	11h		This sensor is provided to support the IPMI v0.9 to v1.0 transition. This is deprecated in IPMI v1.5. See sensor 23h for the recommended definition of the Watchdog sensor for the new v1.0 and the IPMI v1.5 implementations.
		00h	BIOS Watchdog Reset
		01h	OS Watchdog Reset
		02h	OS Watchdog Shut Down
		03h	OS Watchdog Power Down
		04h	OS Watchdog Power Cycle
		05h	OS Watchdog NMI / Diagnostic Interrupt
		06h	OS Watchdog Expired, status only
		07h	OS Watchdog pre-timeout Interrupt, non-NMI

Table 4-5 Sensor Type Codes (Table 36-3 from the IPMI v1.5 Document)

Sensor Type	Sensor Type Code	Sensor Specific Offset (Data 1)	Event
System Event	12h	00h	System Reconfigured
		01h	OEM System Boot Event
		02h	Undetermined system hardware failure (this event would typically require system-specific diagnostics to determine FRU / failure type)
		03h	Entry added to Auxiliary Log (see 25.12, Get Auxiliary Log Status Command and 25.13, Set Auxiliary Log Status Command, for more information) <u>Event Data 2</u> [7:4] - Log Entry Action 0h = entry added 1h = entry added because event did not be map to standard IPMI event 2h = entry added along with one or more corresponding SEL entries 3h = log cleared 4h = log disabled 5h = log enabled all other = reserved [3:0] - Log Type 0h = MCA Log 1h = OEM 1 2h = OEM 2 all other = reserved
		04h	PEF Action <u>Event Data 2</u> The following bits reflect the PEF Actions that are about to be taken after the event filters have been matched. The event is captured before the actions are taken. [7:6] - reserved [5] - 1b = Diagnostic Interrupt (NMI) [4] - 1b = OEM action [3] - 1b = power cycle [2] - 1b = reset [1] - 1b = power off [0] - 1b = Alert

Table 4-5 Sensor Type Codes (Table 36-3 from the IPMI v1.5 Document)

Sensor Type	Sensor Type Code	Sensor Specific Offset (Data 1)	Event
Critical Interrupt	13h	00h 01h 02h 03h 04h 05h 06h 07h 08h 09h	Front Panel NMI / Diagnostic Interrupt Bus Timeout I/O channel check NMI Software NMI PCI PERR PCI SERR EISA Fail Safe Timeout Bus Correctable Error Bus Uncorrectable Error Fatal NMI (port 61h, bit 7)
Button	14h	00h 01h 02h	Power Button pressed Sleep Button pressed Reset Button pressed
Module / Board	15h	-	-
Microcontroller / Coprocessor	16h	-	-
Add-in Card	17h	-	-
Chassis	18h	-	-
Chip Set	19h	-	-
Other FRU	1Ah	-	-
Cable / Interconnect	1Bh	-	-
Terminator	1Ch	-	-
System Boot Initiated	1Dh	00h 01h 02h 03h 04h	Initiated by power up Initiated by hard reset Initiated by warm reset User requested PXE boot Automatic boot to diagnostic
Boot Error	1Eh	00h 01h 02h 03h 04h	No bootable media Non-bootable diskette left in drive PXE Server not found Invalid boot sector Timeout waiting for user selection of boot source

Table 4-5 Sensor Type Codes (Table 36-3 from the IPMI v1.5 Document)

Sensor Type	Sensor Type Code	Sensor Specific Offset (Data 1)	Event
OS Boot	1Fh	00h 01h 02h 03h 04h 05h 06h	A: boot completed C: boot completed PXE boot completed Diagnostic boot completed CD-ROM boot completed ROM boot completed boot completed - boot device not specified
OS Critical Stop	20h	00h 01h	Stop during OS load / initialization Run-time Stop

Table 4-5 Sensor Type Codes (Table 36-3 from the IPMI v1.5 Document)

Sensor Type	Sensor Type Code	Sensor Specific Offset (Data 1)	Event
Slot / Connector	21h	00h 01h 02h 03h 04h 05h 06h 07h 08h	Fault Status asserted Identify Status asserted Slot / Connector Device installed/attached [This can include dock events] Slot / Connector Ready for Device Installation - Typically, this means that the slot power is off. The Ready for Installation, Ready for Removal, and Slot Power states can transition together, depending on the slot implementation. Slot/Connector Ready for Device Removal Slot Power is Off Slot / Connector Device Removal Request - This is typically connected to a switch that becomes asserted to request removal of the device) Interlock asserted - This is typically connected to a switch that mechanically enables/disables power to the slot, or locks the slot in the 'Ready for Installation / Ready for Removal states' - depending on the slot implementation. The asserted state indicates that the lock-out is active. Slot is Disabled The Event Data 2 & 3 fields can be used to provide an event extension code, with the following definition: Event Data 2 7 reserved 6:0 Slot/Connector Type 0 PCI 1 Drive Array 2 External Peripheral Connector 3 Docking 4 other standard internal expansion slot 5 slot associated with entity specified by Entity ID for sensor all other = reserved Event Data 3 7:0 Slot/Connector Number

Table 4-5 Sensor Type Codes (Table 36-3 from the IPMI v1.5 Document)

Sensor Type	Sensor Type Code	Sensor Specific Offset (Data 1)	Event
System ACPI Power State	22h	00h	S0 / G0 “working”
		01h	S1 “sleeping with system h/w & processor context maintained”
		02h	S2 “sleeping, processor context lost”
		03h	S3 “sleeping, processor & h/w context lost, memory retained.”
		04h	S4 “non-volatile sleep / suspend-to disk”
		05h	S5 / G2 “soft-off”
		06h	S4 / S5 soft-off, particular S4 / S5 state cannot be determined
		07h	G3 / Mechanical Off
		08h	Sleeping in an S1, S2, or S3 states (used when particular S1, S2, S3 state cannot be determined)
		09h	G1 sleeping (S1-S4 state cannot be determined)
		0Ah	S5 entered by override
		0Bh	Legacy ON state
		0Ch	Legacy OFF state
		0Eh	Unknown

Table 4-5 Sensor Type Codes (Table 36-3 from the IPMI v1.5 Document)

Sensor Type	Sensor Type Code	Sensor Specific Offset (Data 1)	Event
Watchdog 2	23h		This sensor is recommended for new IPMI v1.0 and later implementations.
		00h 01h 02h 03h 04h-07h 08h	Timer expired, status only (no action, no interrupt) Hard Reset Power Down Power Cycle reserved Timer interrupt
			The Event Data 2 field for this command can be used to provide an event extension code, with the following definition: 7:4 interrupt type 0h = none 1h = SMI 2h = NMI 3h = Messaging Interrupt Fh = unspecified all other = reserved 3:0 timer use at expiration: 0h = reserved 1h = BIOS FRB2 2h = BIOS/POST 3h = OS Load 4h = SMS/OS 5h = OEM Fh = unspecified all other = reserved
Platform Alert	24h		This sensor can be used for returning the state and generating events associated with alerts that have been generated by the platform management subsystem
		00h 01h 02h 03h	platform generated page platform generated LAN alert Platform Event Trap generated, formatted per IPMI PET specification platform generated SNMP trap, OEM format

Table 4-5 Sensor Type Codes (Table 36-3 from the IPMI v1.5 Document)

Sensor Type	Sensor Type Code	Sensor Specific Offset (Data 1)	Event
Entity Presence	25h		This sensor type provides a mechanism that allows a management controller to direct system management software to ignore a set of sensors based on detecting that presence of an entity. This sensor type is not typically used for event generation - but to just provide a present reading.
		00h	Entity Present. This indicates that the Entity identified by the Entity ID for the sensor is present.
		01h	Entity Absent. This indicates that the Entity identified by the Entity ID for the sensor is absent. If the entity is absent, system management software should consider all sensors associated with that Entity to be absent as well - and ignore those sensors.
		02h	Entity Disabled. The Entity is present, but has been disabled. A deassertion of this event indicates that the Entity has been enabled.
Monitor ASIC / IC	26h	-	-
LAN	27h	00h 01h	LAN Heartbeat Lost LAN Heartbeat
Management Subsystem Health	28h	00h 01h 02h 03h	sensor access degraded or unavailable controller access degraded or unavailable management controller off-line management controller unavailable
Battery	29h	00h 01h 02h	battery low (predictive failure) battery failed battery presence detected
Reserved	remaining	-	-
OEM RESERVED	C0h - FFh	-	-

Component-Specific SEL Decoding Tables

The component-specific SEL decoding tables are available for download from http://www.hp.com/

To download the decoding tables go to http://www.hp.com/. Select the Software & Drivers link. Enter your product in the dialog box and select ‘go’. Select the desired decoding table and follow the instructions for downloading.